

OK to
enter
Sec 3/27/07.

PATENT
Attorney Docket No.: 420229

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	Edward Raymond Dowski, Jr., et al	Confirmation No.:	6078
Serial No.:	10/813,993	Group No.:	2624
Filed:	March 31, 2004	Examiner:	Sheela C. Chawan
For:	System And Methods For Minimizing Aberrating Effects In Imaging Systems		

March 23, 2007

Box: ISSUE FEE
Commissioner For Patent
Washington, D.C. 20231

TRANSMITTAL OF FORMAL DRAWINGS

In accordance with a telephone discussion with Examiner Chawan on 20 March 2007, attached please find formal drawing(s) for this application. A total of 37 sheets are attached.

REMARKS

We note, in a copy of the "Notice of Withdrawal From Issue" obtained from the PAIR system, that the notice was sent to the wrong law firm, and that the stated reason for withdrawal from issue is inconsistent with the cited subsection of 37 CFR 1.313(b).

Applicant believes no fees are currently due, however, if any fee is deemed necessary in connection with this Transmittal of Formal Drawings, please charge Deposit Account No. 12-0600.

Respectfully submitted,
LATHROP & GAGE L.C.



John Lindemann, Reg. No. 54,273
4845 Pearl East Circle, Suite 300
Boulder, CO 80301
Tel No: (720) 931-3018
Fax No: (720) 931-3001

Title: METHODS FOR MINIMIZING ABERRATING EFFECTS IN IMAGING SYSTEMS

Inventor: Edward R. Dowski Jr. et al

Attorney Docket No: 420229

1/37

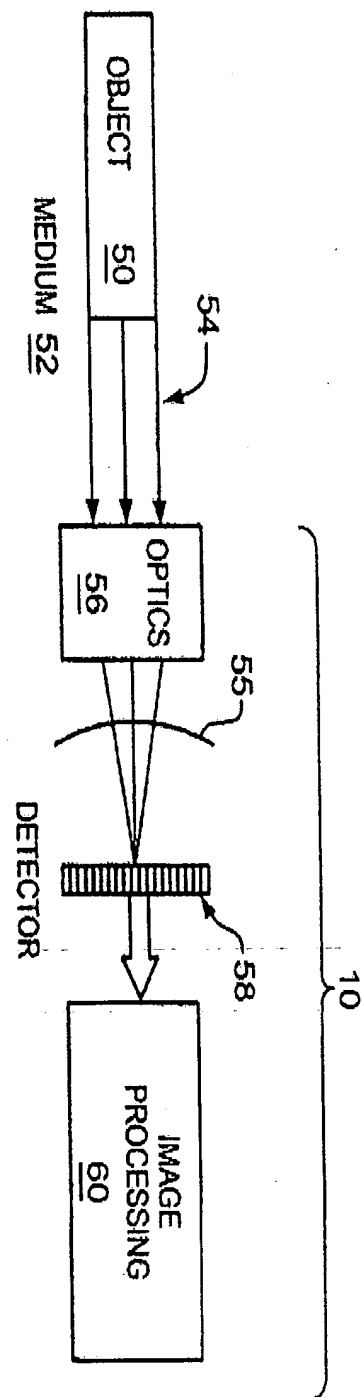


FIG. 1
PRIOR ART

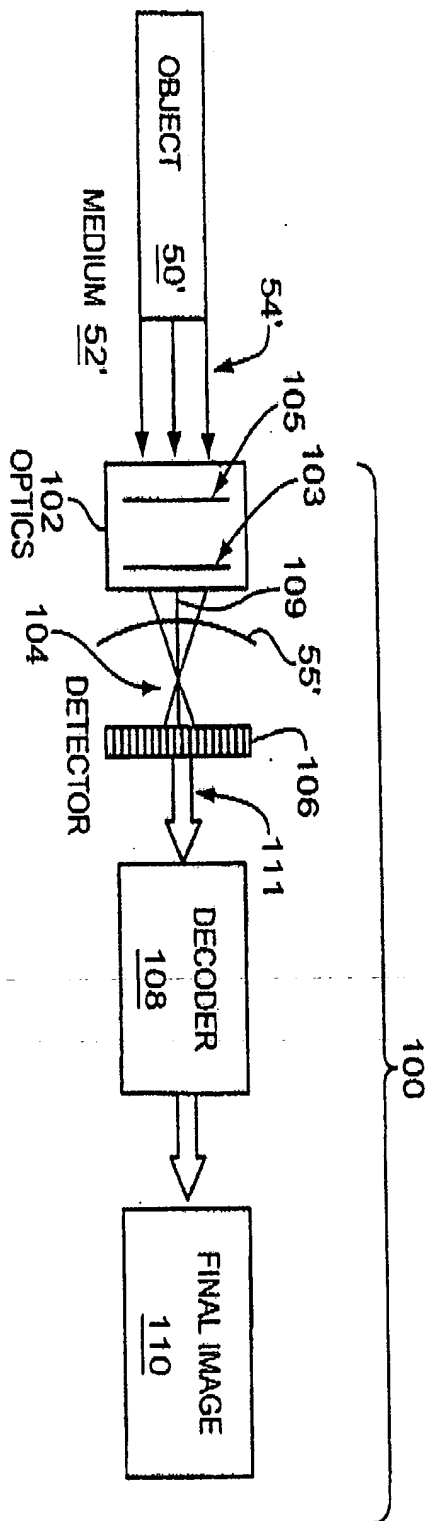


FIG. 2

Title: METHODS FOR MINIMIZING ABERRATING EFFECTS IN IMAGING SYSTEMS

Inventor: Edward R. Dowski Jr. et al

Attorney Docket No: 420229

2/37

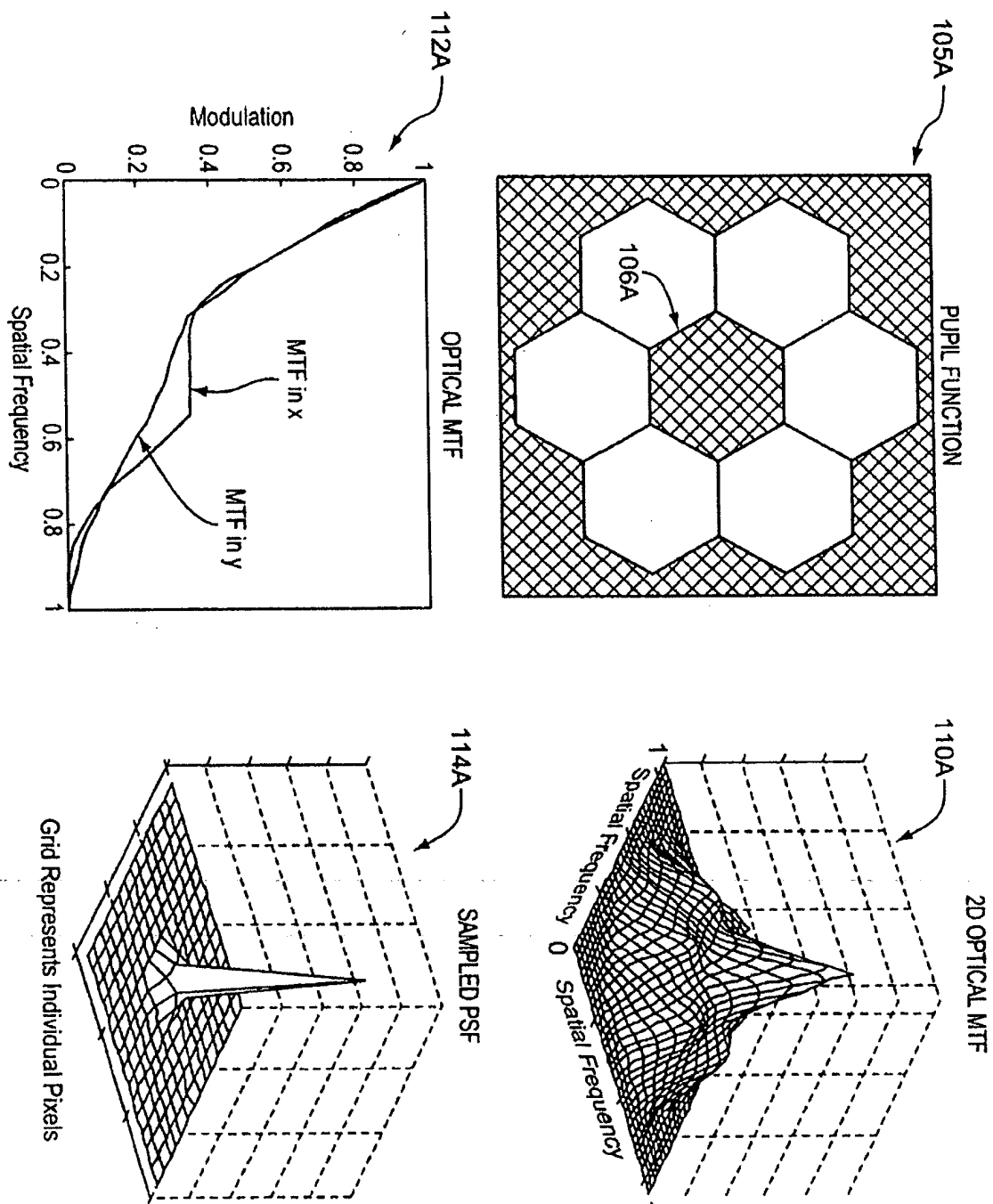


FIG. 3

Title: METHODS FOR MINIMIZING ABERRATING EFFECTS IN IMAGING SYSTEMS

Inventor: Edward R. Dowski Jr. et al

Attorney Docket No: 420229

3/37

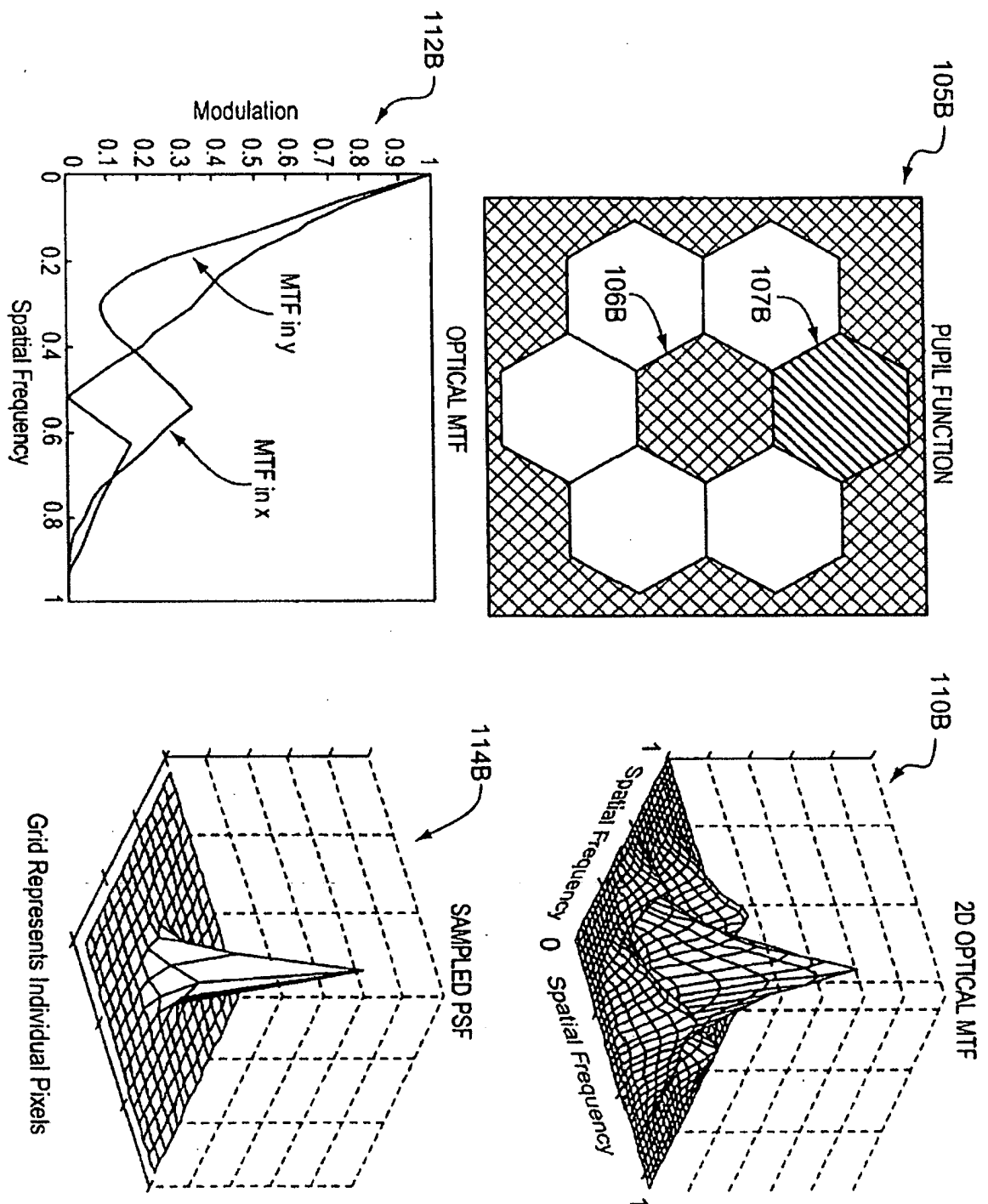


FIG. 4

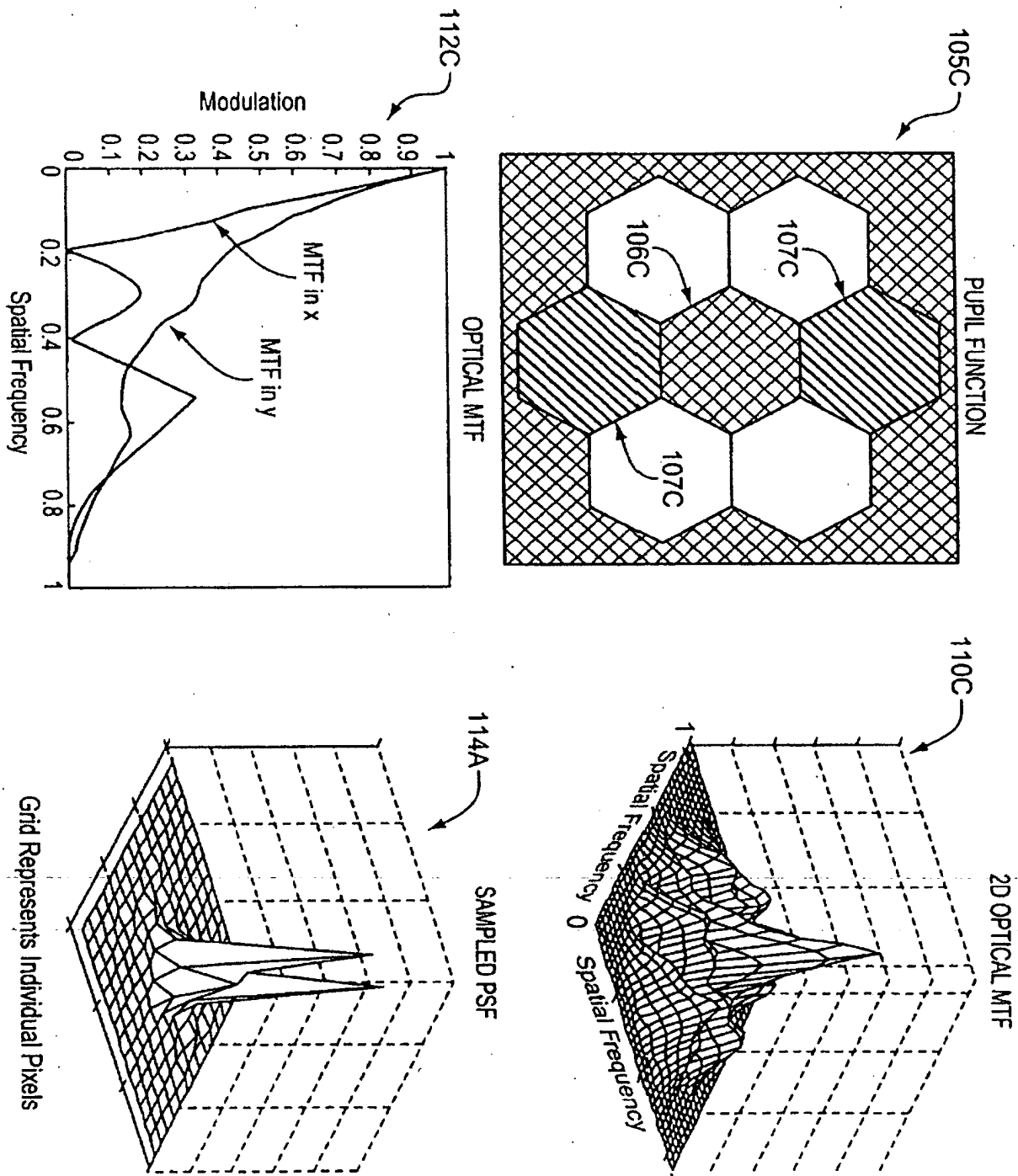


FIG. 5

Title: METHODS FOR MINIMIZING ABERRATING EFFECTS IN IMAGING SYSTEMS

Inventor: Edward R. Dowski Jr. et al

Attorney Docket No: 420229

5/37

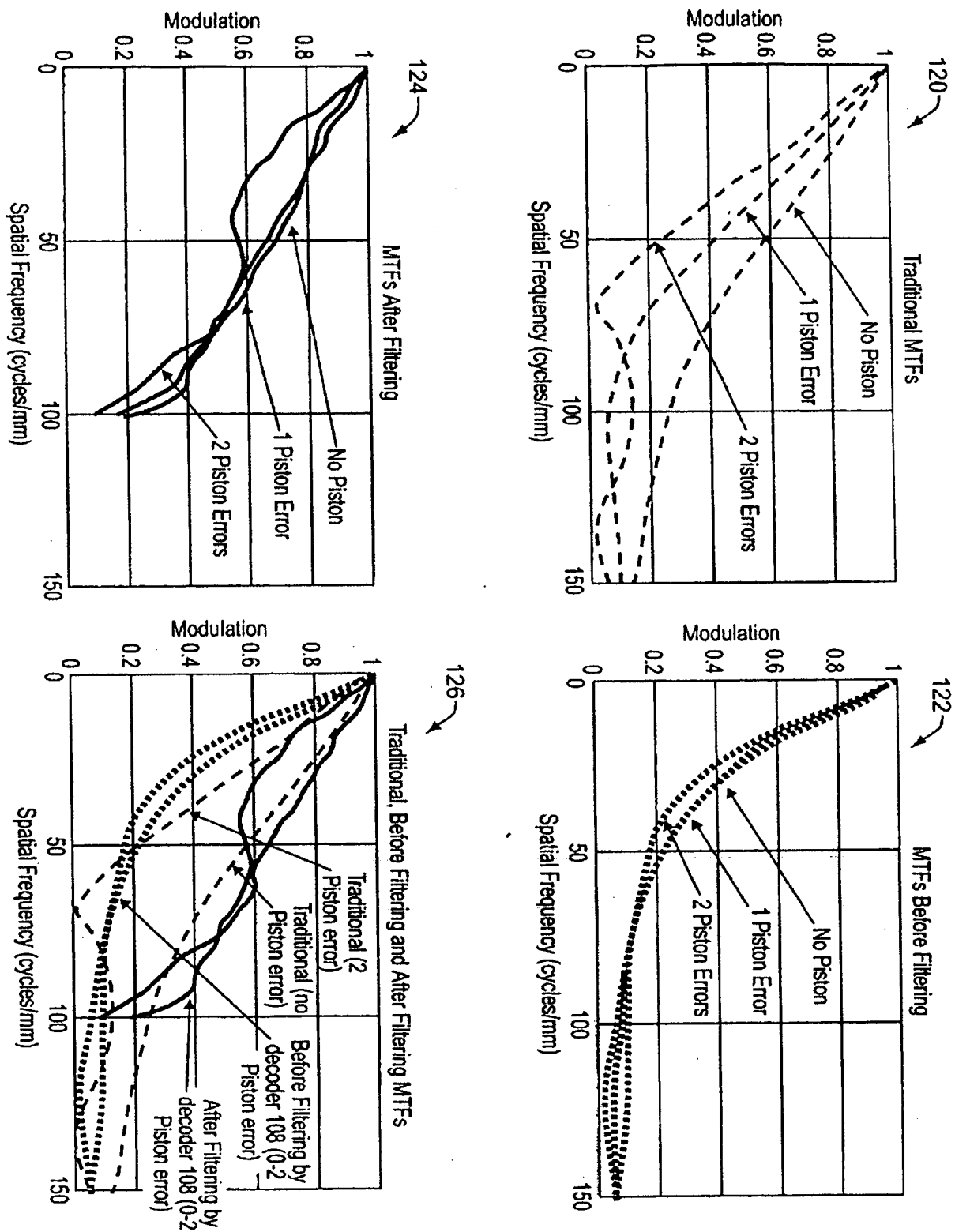


FIG. 6

Title: METHODS FOR MINIMIZING ABERRATING EFFECTS IN IMAGING SYSTEMS

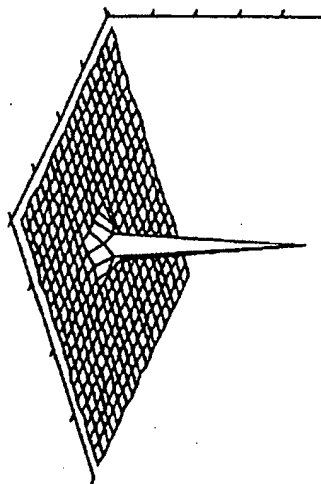
Inventor: Edward R. Dowski Jr. et al

Attorney Docket No: 420229

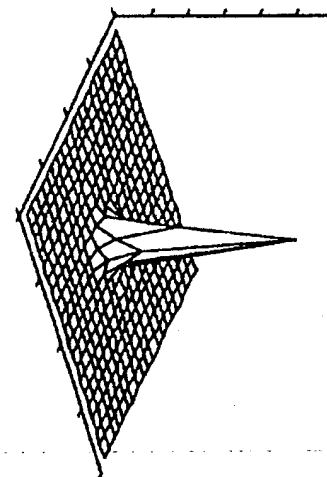
6/37

TRADITIONAL IMAGING

NO PISTON ERROR



1 PISTON ERROR



2 PISTON ERRORS

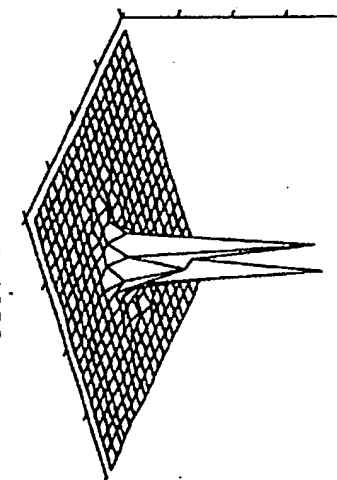
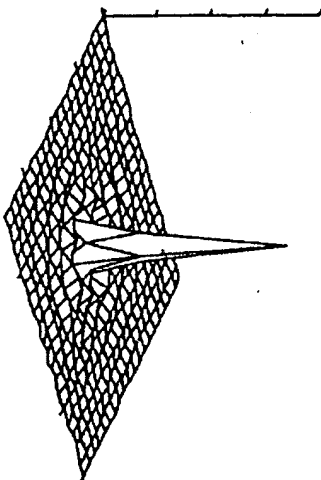


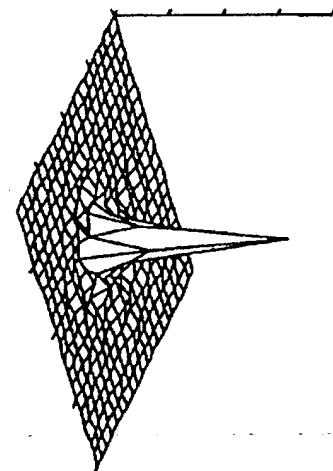
FIG. 7A

AFTER FILTERING

NO PISTON ERROR



1 PISTON ERROR



2 PISTON ERRORS

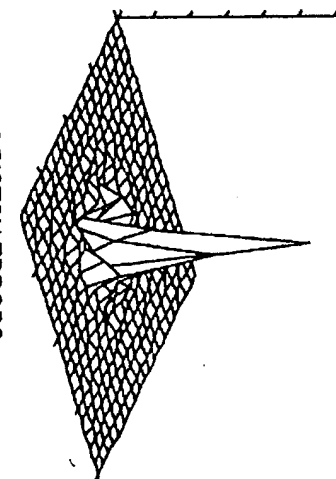


FIG. 7B

Title: METHODS FOR MINIMIZING ABERRATING EFFECTS IN IMAGING SYSTEMS

Inventor: Edward R. Dowski Jr. et al

Attorney Docket No: 420229

7/37

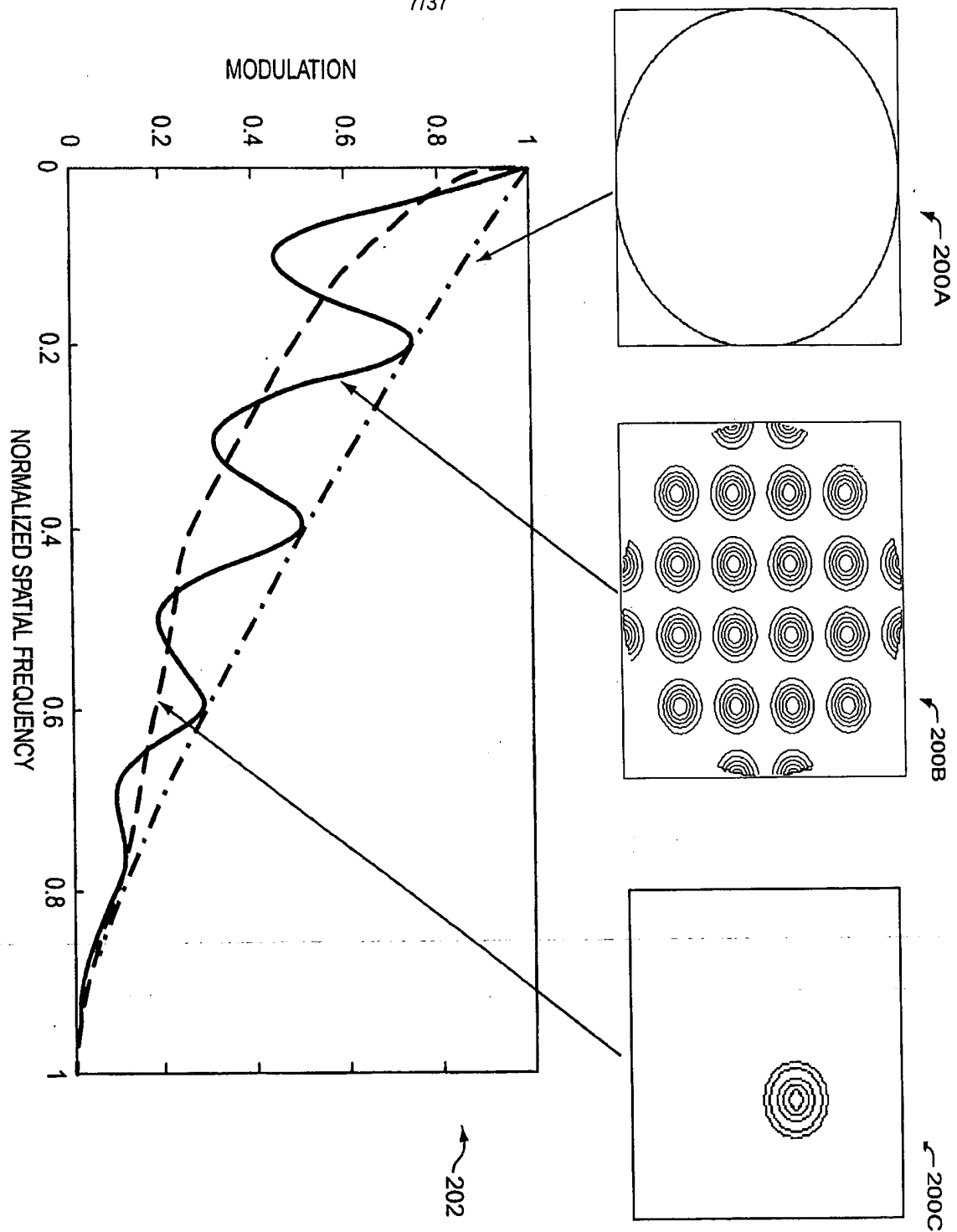


FIG. 8

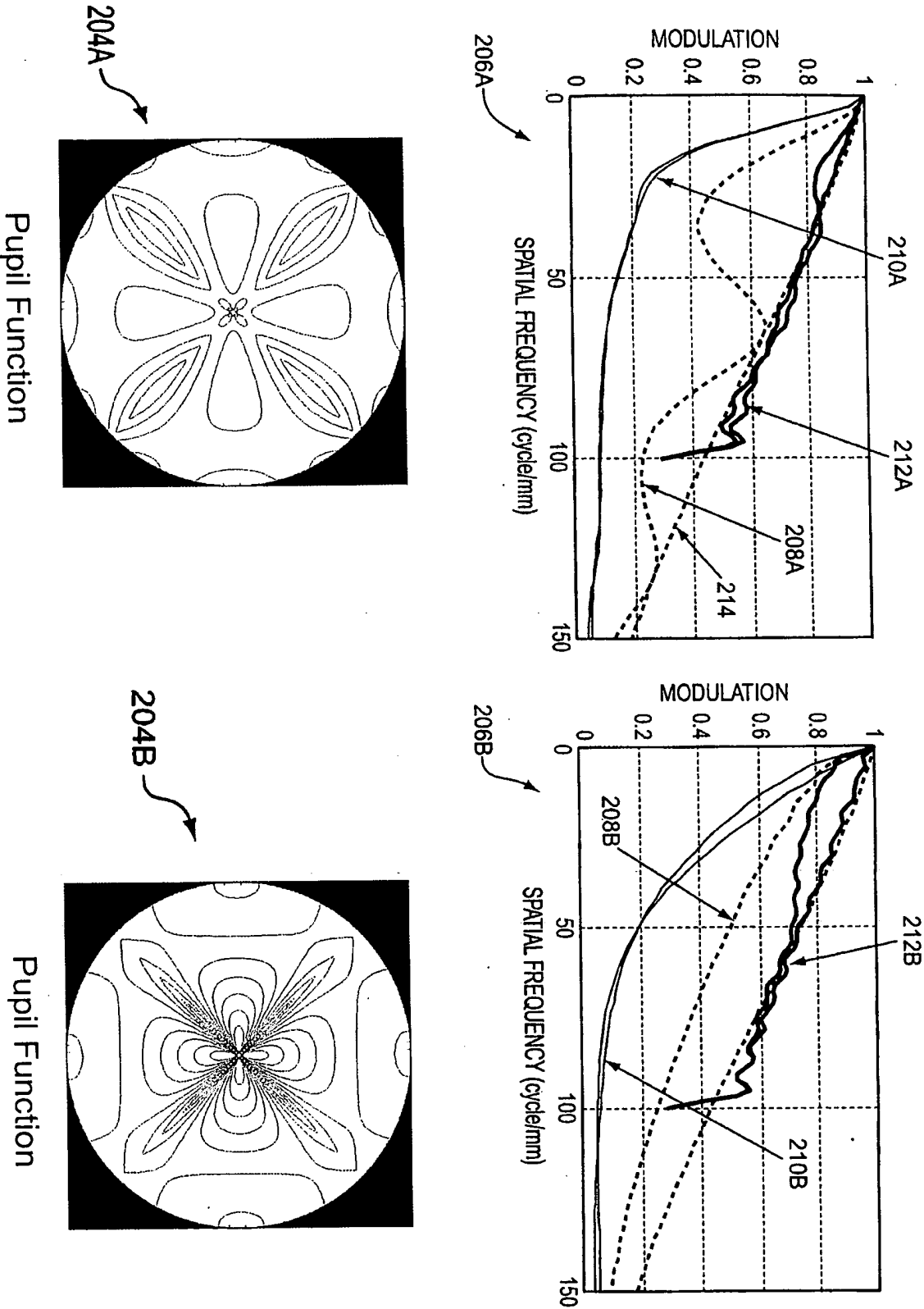
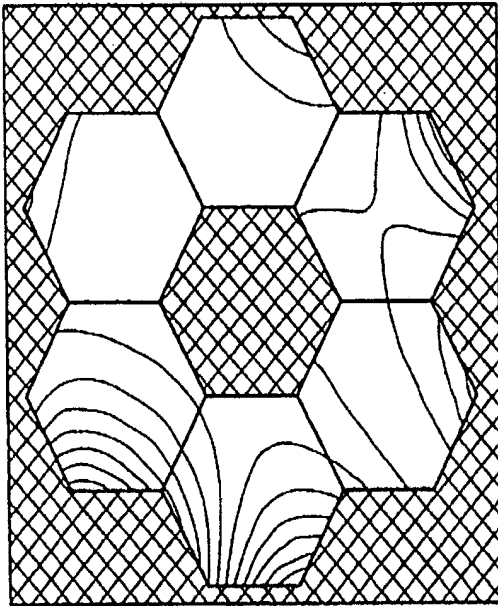


FIG. 9

FIG. 10**PUPIL FUNCTION****FIRST ORDER OPTICAL PARAMETERS**

2-meter collecting aperture

12-meter focal length

5- μ m pixel size

100% fill factor

0.5 μ m wavelength

Phase function is a Zernike polynomial with the following weights

#	Mathematical Form	Weight	#	Mathematical Form	Weight
0	1	0	11	$(4\rho^2 - 3)\rho^2 \cos 2\theta$	0.0379
1	$\rho \cos \theta$	0	12	$(4\rho^2 - 3)\rho^2 \sin 2\theta$	-0.1151
2	$\rho \sin \theta$	0	13	$\rho^4 \cos 4\theta$	0.5730
3	$2\rho^2 - 1$	-0.1914	14	$\rho^4 \sin 4\theta$	0.2412
4	$\rho^2 \cos 2\theta$	-0.3986	15	$(4\rho^4 - 12\rho^2 + 3)\rho \cos \theta$	-0.3050
5	$\rho^2 \sin 2\theta$	0.0290	16	$(4\rho^4 - 12\rho^2 + 3)\rho \sin \theta$	-0.1698
6	$(3\rho^2 - 2)\rho \cos \theta$	0.1073	17	$(5\rho^5 - 4\rho^3)\cos 3\theta$	0.0589
7	$(3\rho^2 - 2)\rho \sin \theta$	-0.0336	18	$(5\rho^5 - 4\rho^3)\sin 3\theta$	-0.0965
8	$\rho^3 \cos 3\theta$	0.0496	19	$\rho^5 \cos 5\theta$	0.7186
9	$\rho^3 \sin 3\theta$	-0.0562	20	$\rho^5 \sin 5\theta$	-0.5219
10	$6\rho^4 - 6\rho^2 + 1$	-0.2093			

Title: METHODS FOR MINIMIZING ABERRATING EFFECTS IN IMAGING SYSTEMS

Inventor: Edward R. Dowski Jr. et al

Attorney Docket No: 420229

10/37

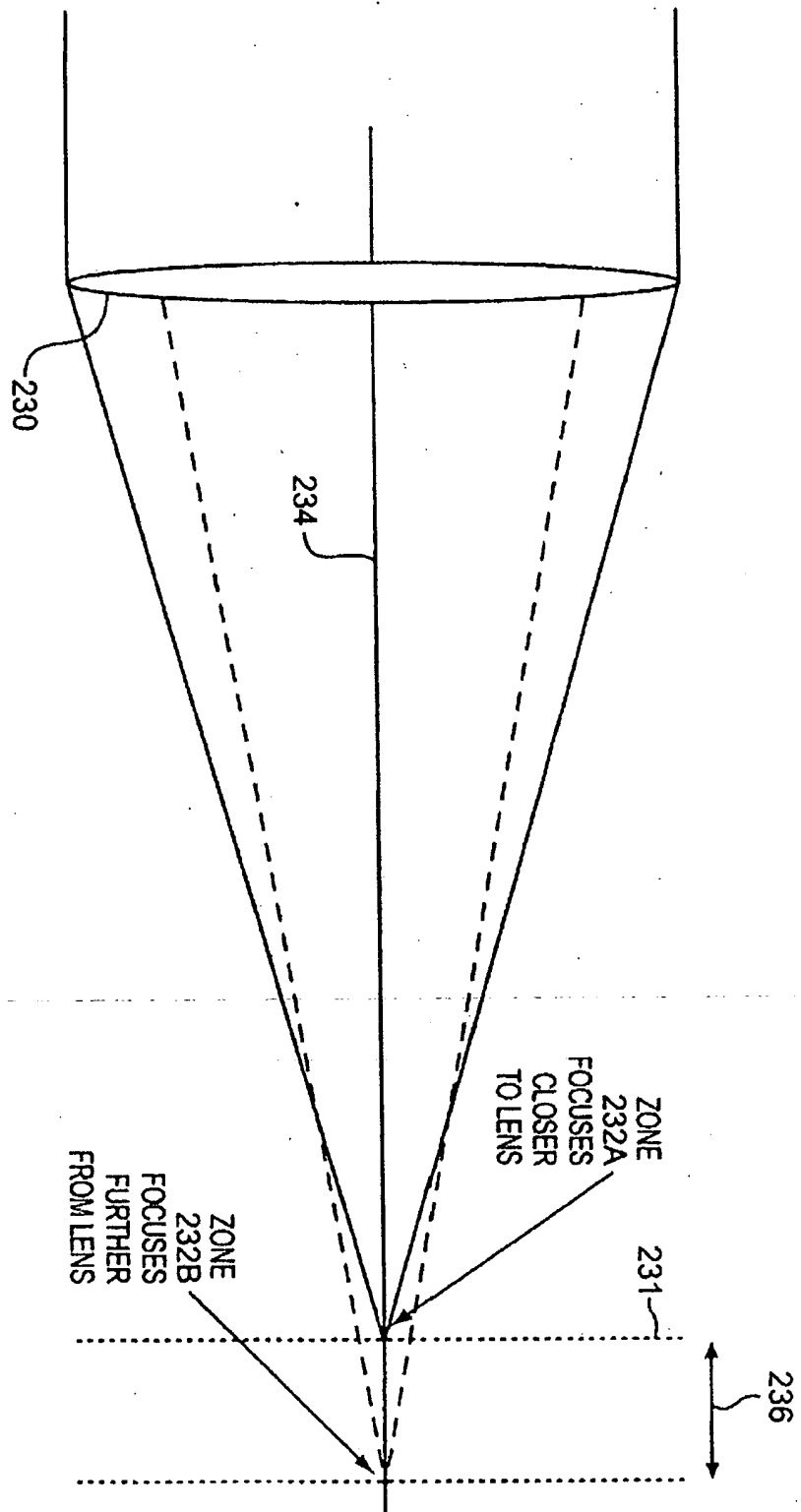
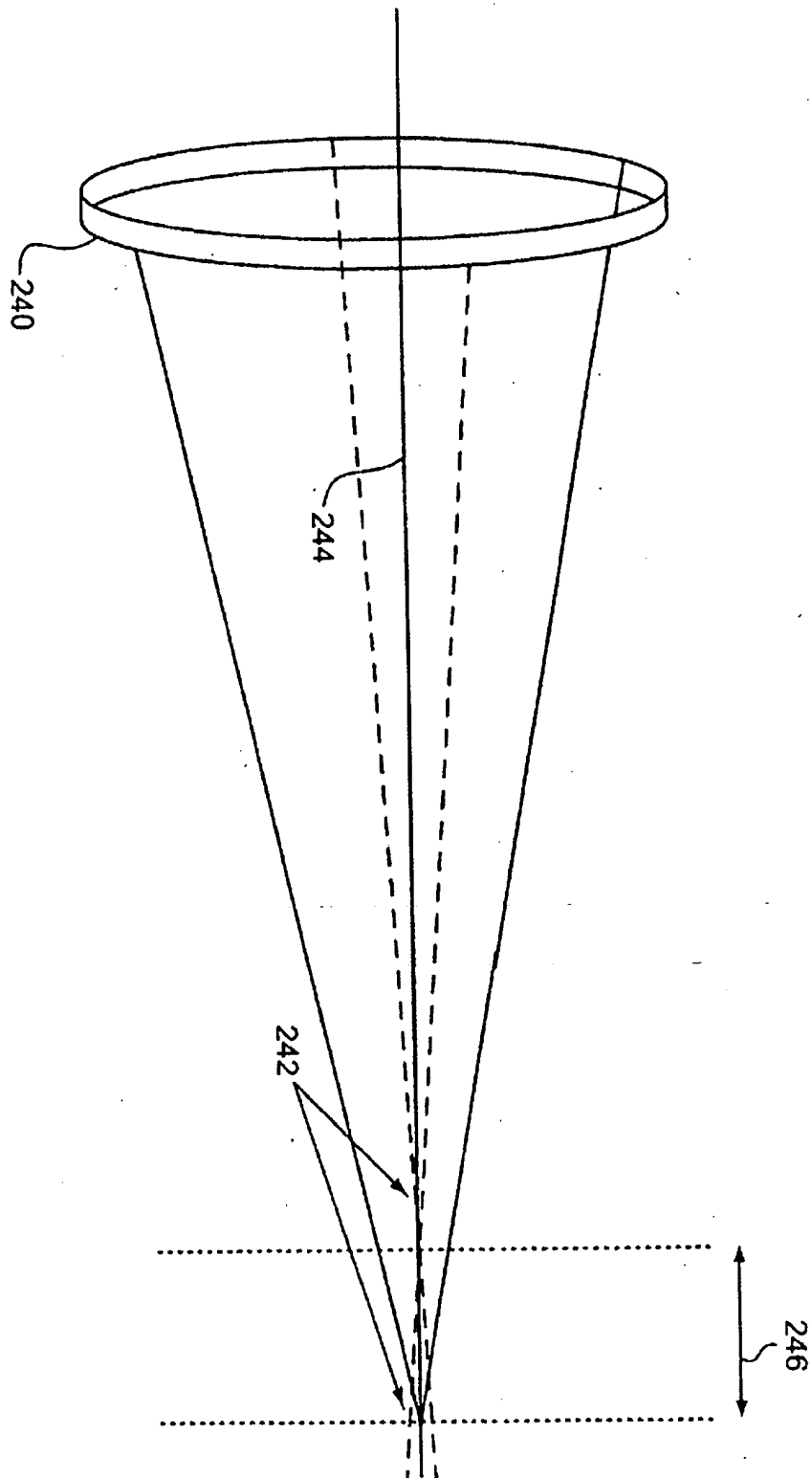


FIG. 11

FIG. 12



Title: METHODS FOR MINIMIZING ABERRATING EFFECTS IN IMAGING SYSTEMS

Inventor: Edward R. Dowski Jr. et al

Attorney Docket No: 420229

12/37

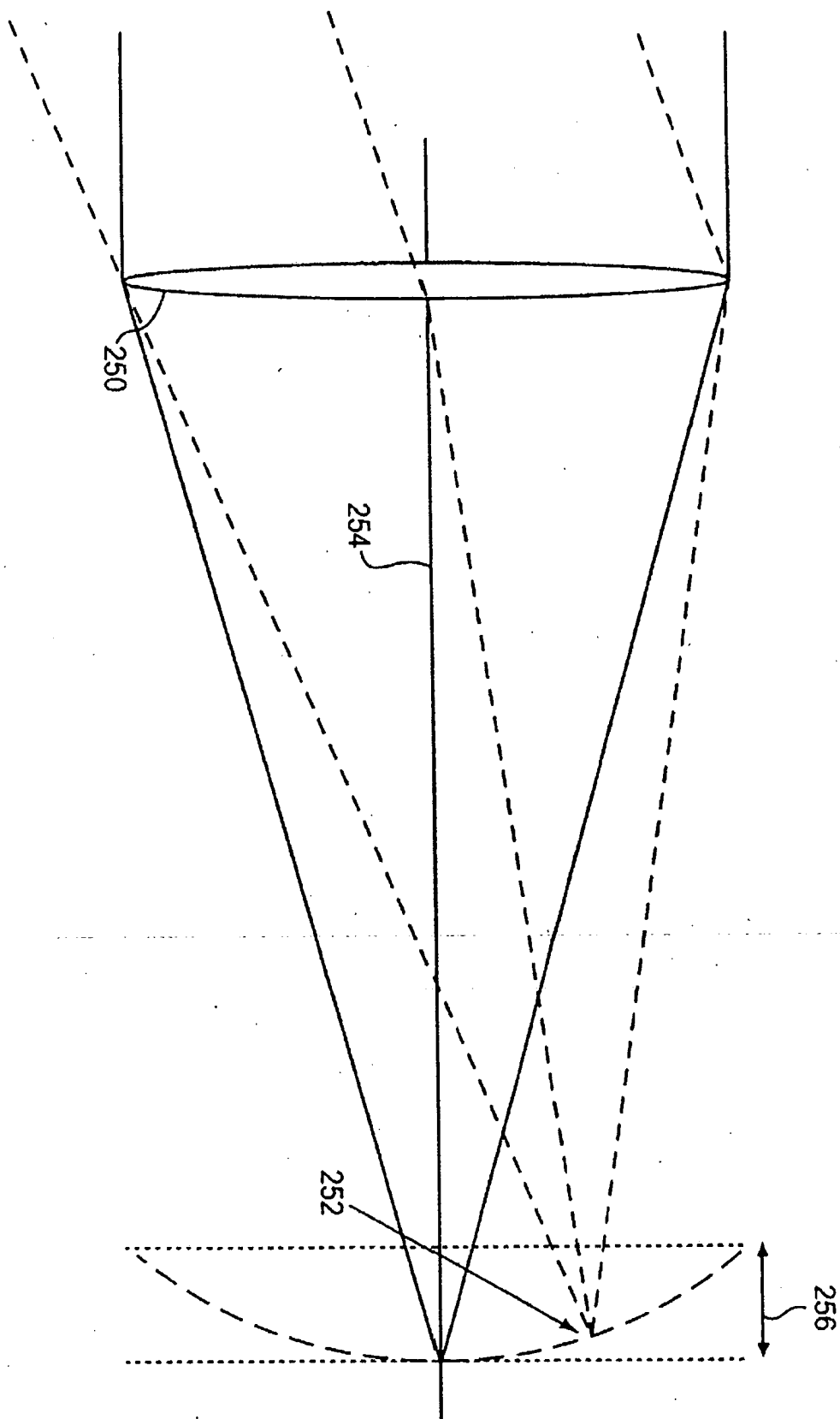


FIG. 13

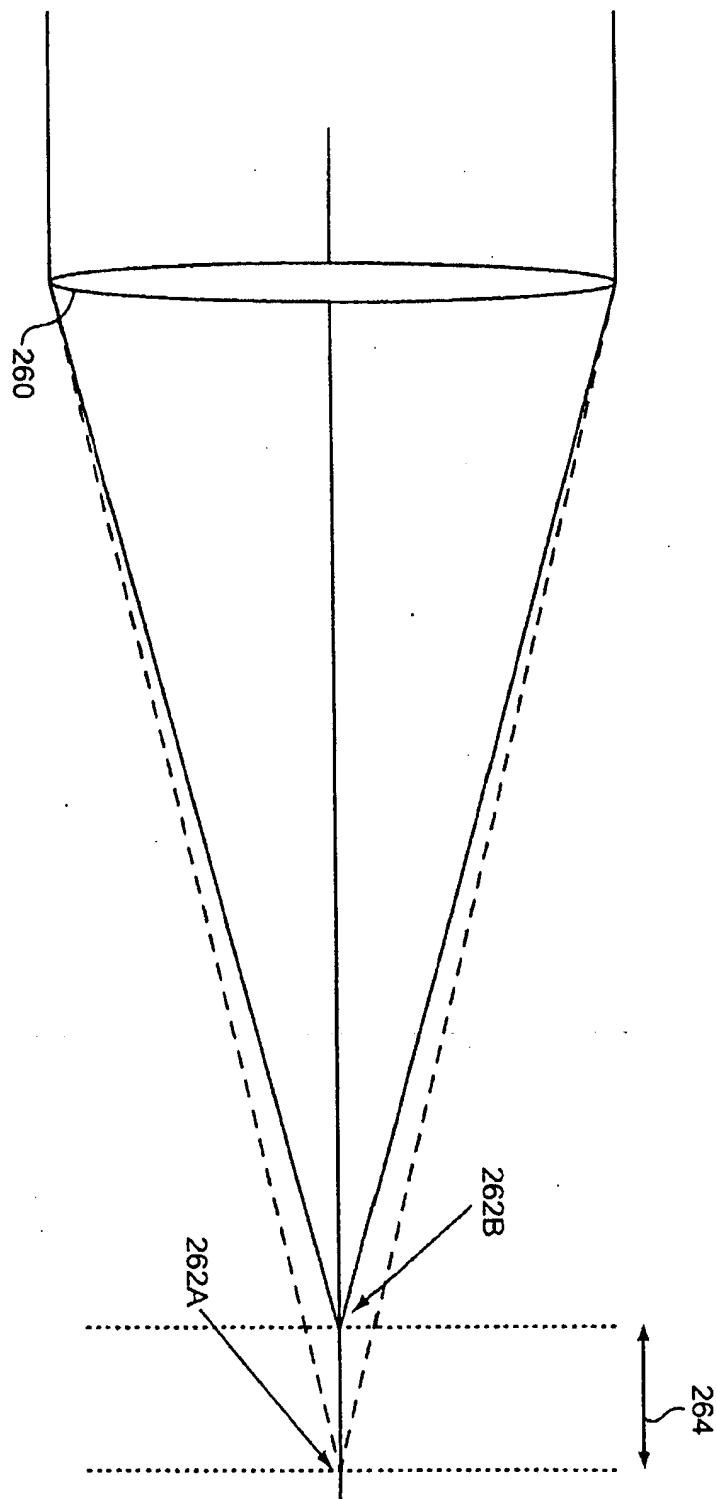


FIG. 14

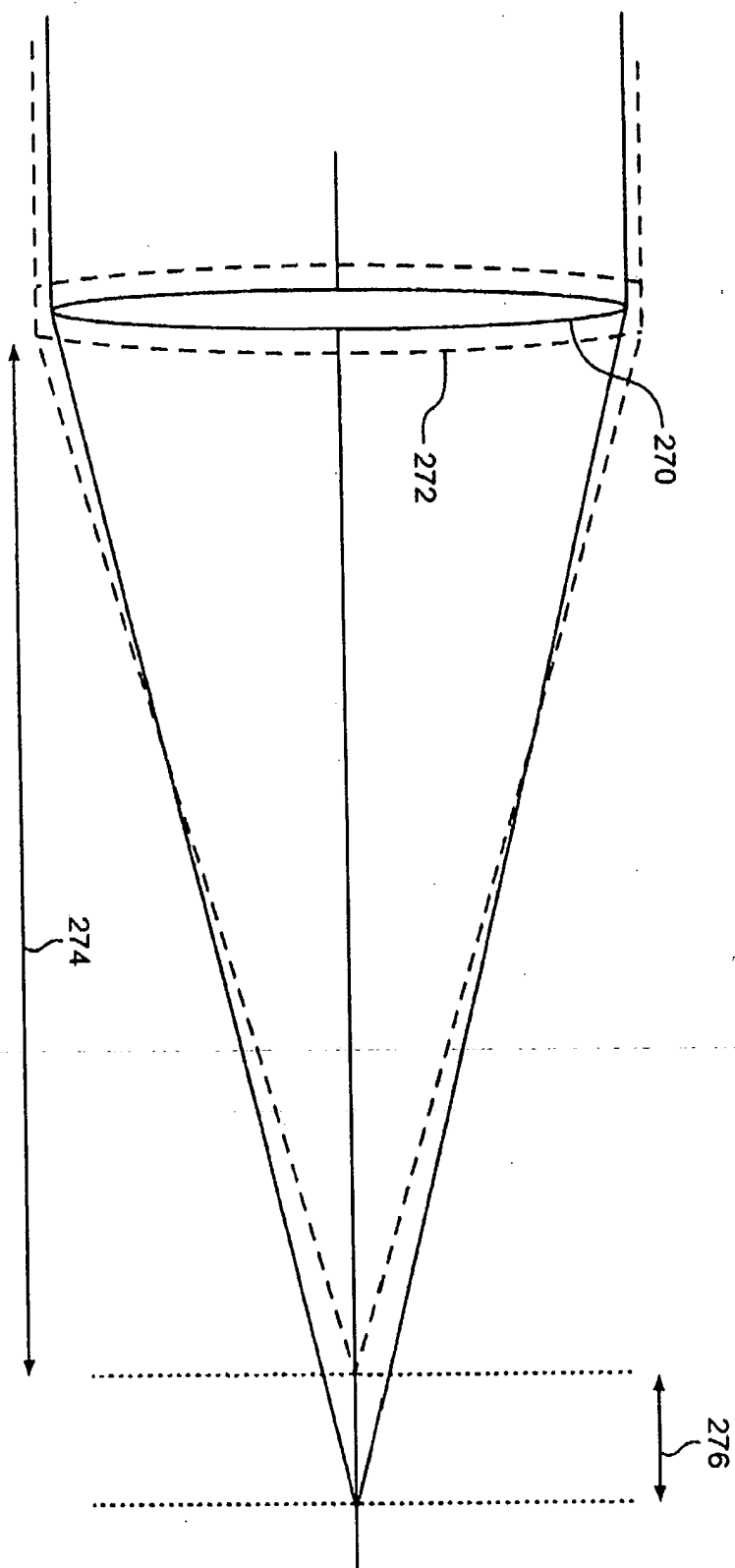
Title: METHODS FOR MINIMIZING ABERRATING EFFECTS IN IMAGING SYSTEMS

Inventor: Edward R. Dowski Jr. et al

Attorney Docket No: 420229

14/37

FIG. 15



Title: METHODS FOR MINIMIZING ABERRATING EFFECTS IN IMAGING SYSTEMS

Inventor: Edward R. Dowski Jr. et al

Attorney Docket No: 420229

15/37

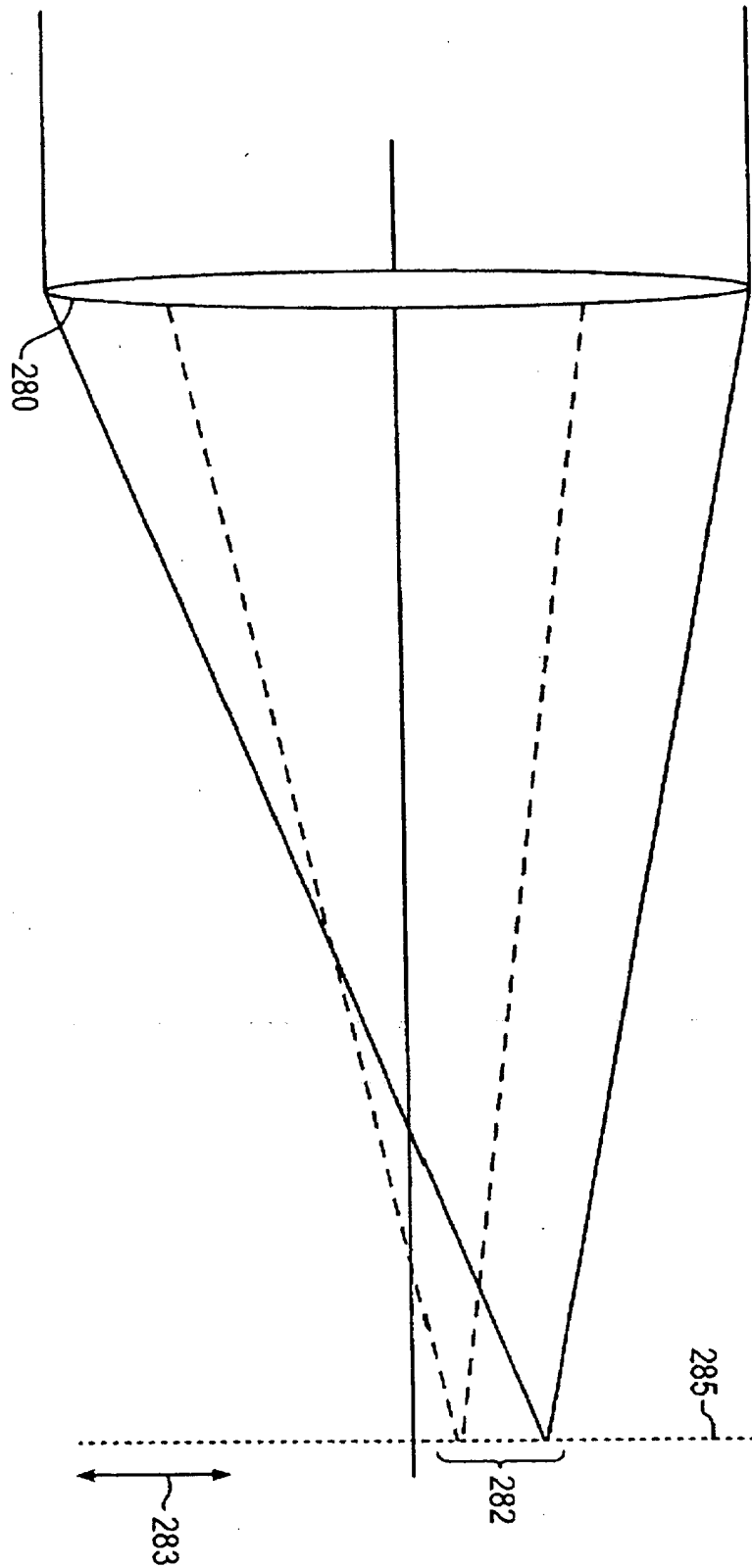


FIG. 16

FIG. 17

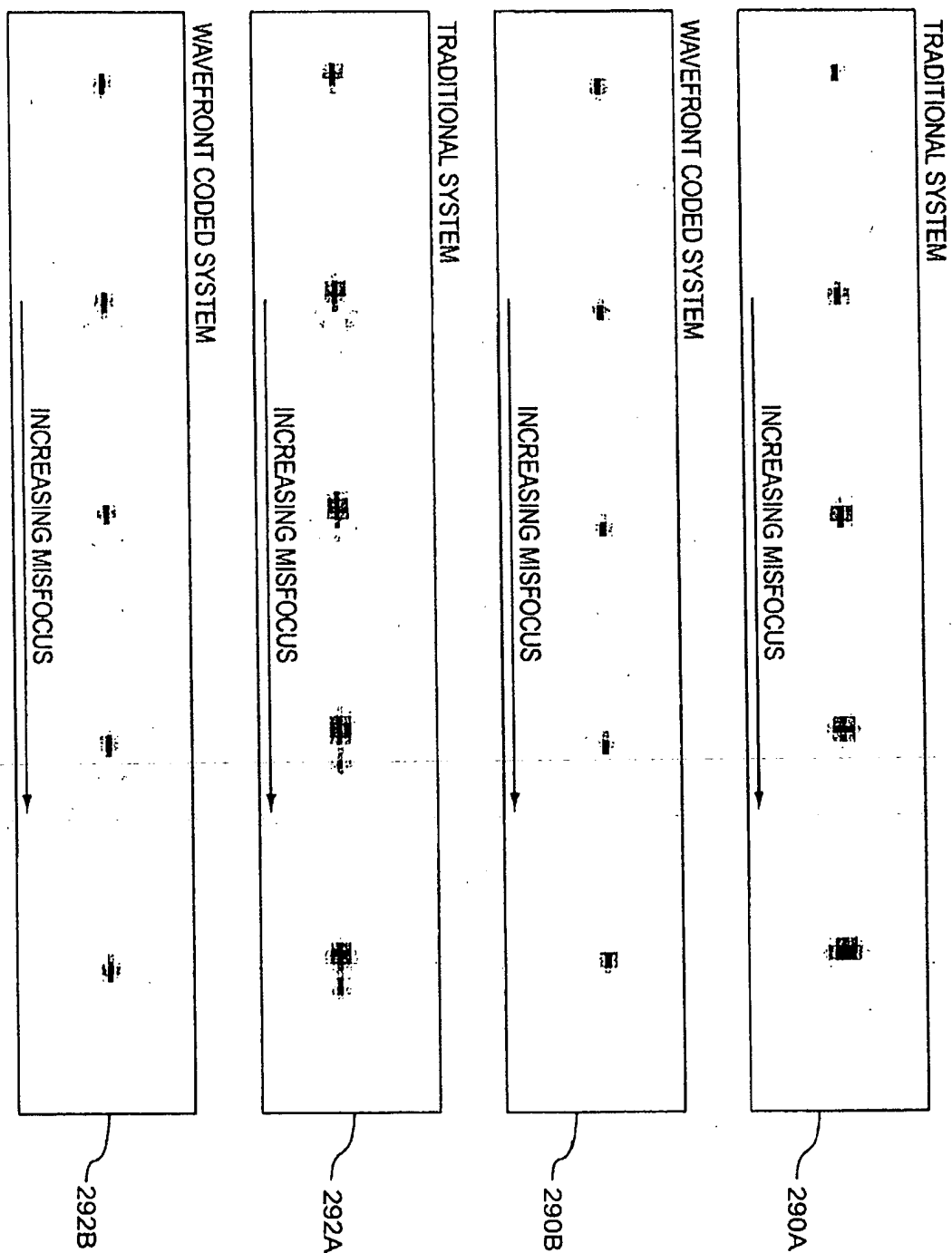
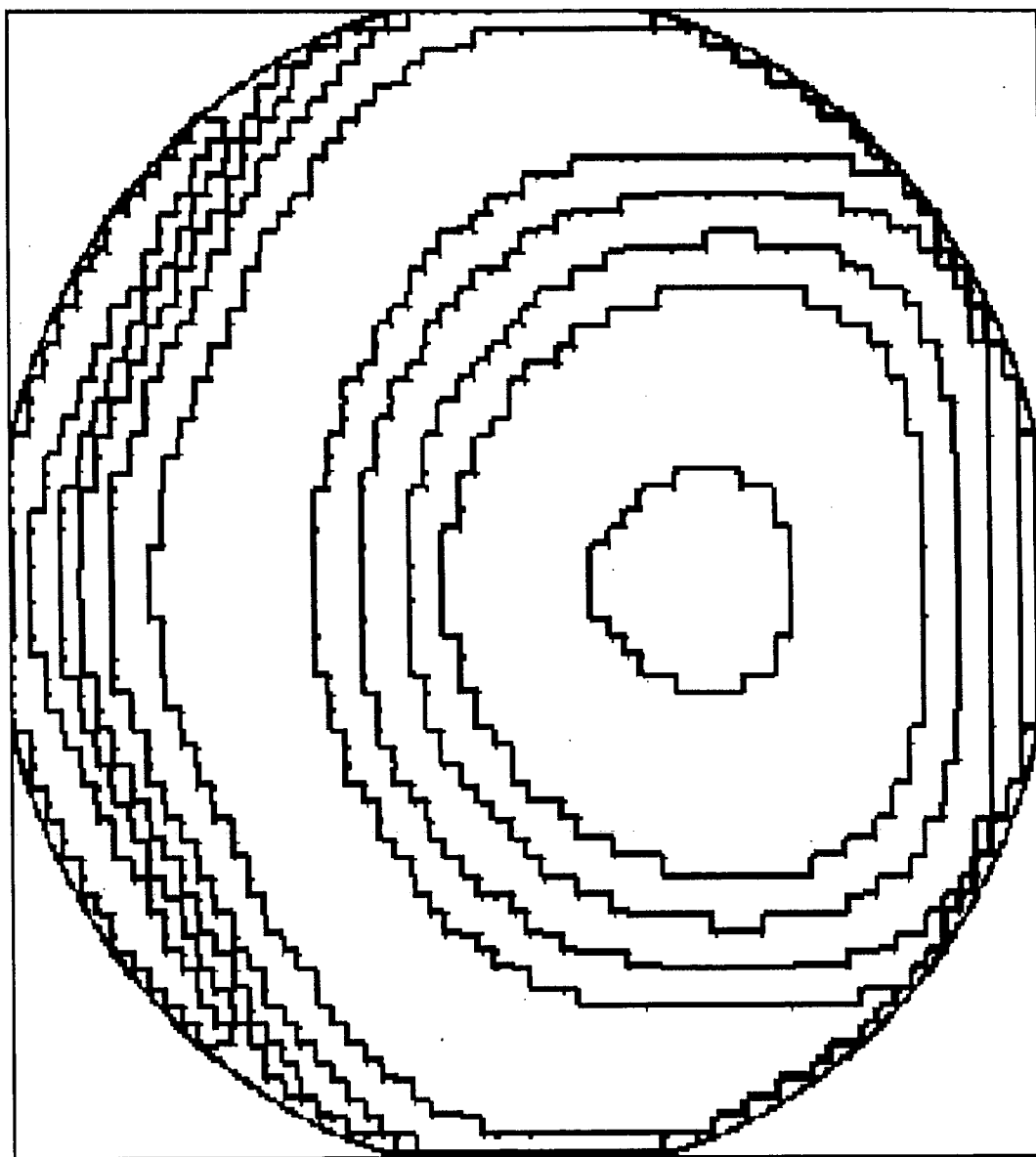


FIG. 17A

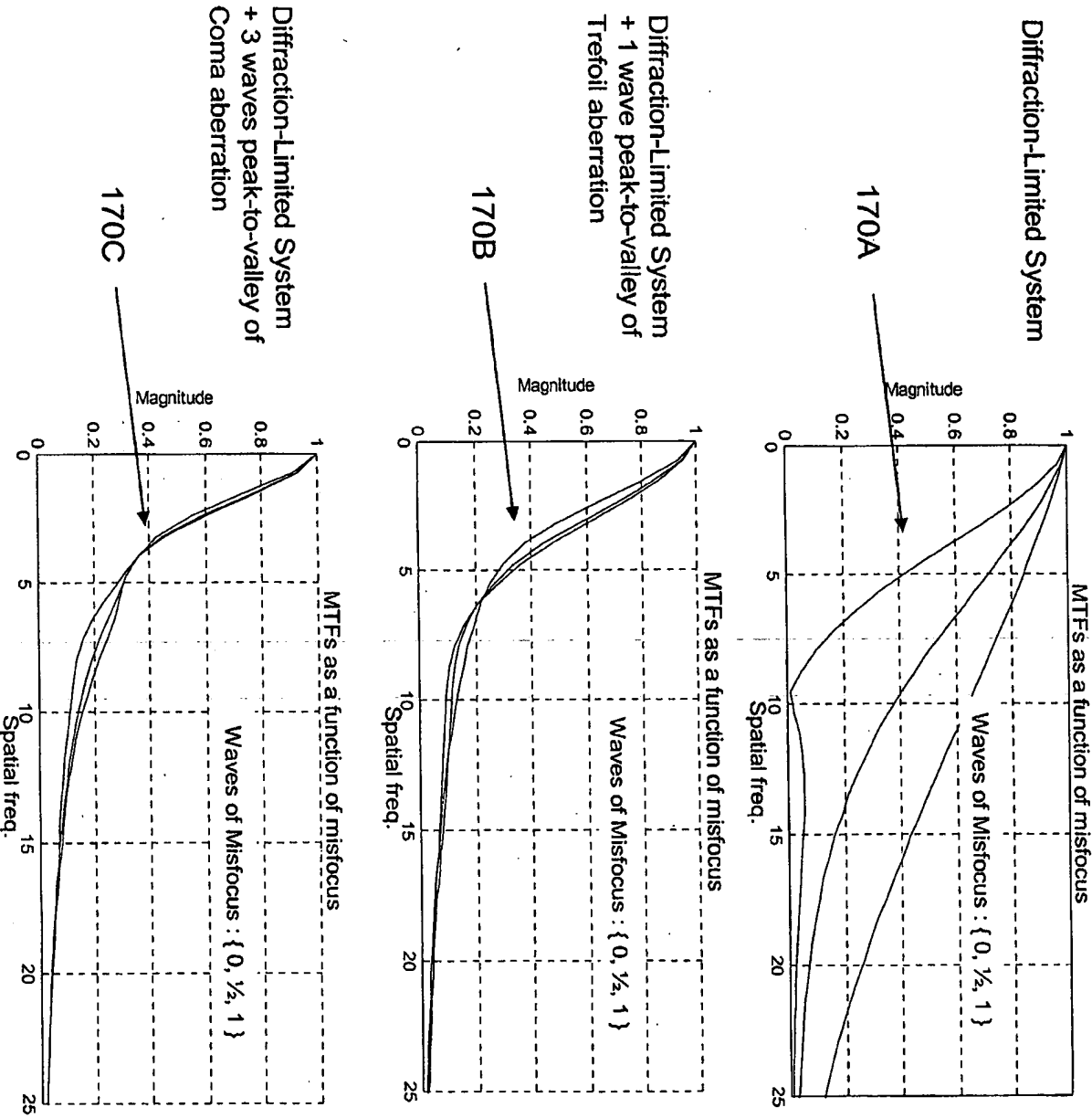
EXIT PUPIL OPD IN WAVES



Weights = [-0.1837 -0.3292 0.3110 -0.0210 -0.0628]

Functional Form = [R R³ R⁵ Rcos(θ) R³cos(3θ)]

FIG. 17B



Title: METHODS FOR MINIMIZING ABERRATING EFFECTS IN IMAGING SYSTEMS

Inventor: Edward R. Dowski Jr. et al

Attorney Docket No: 420229

19/37

FIG. 17C

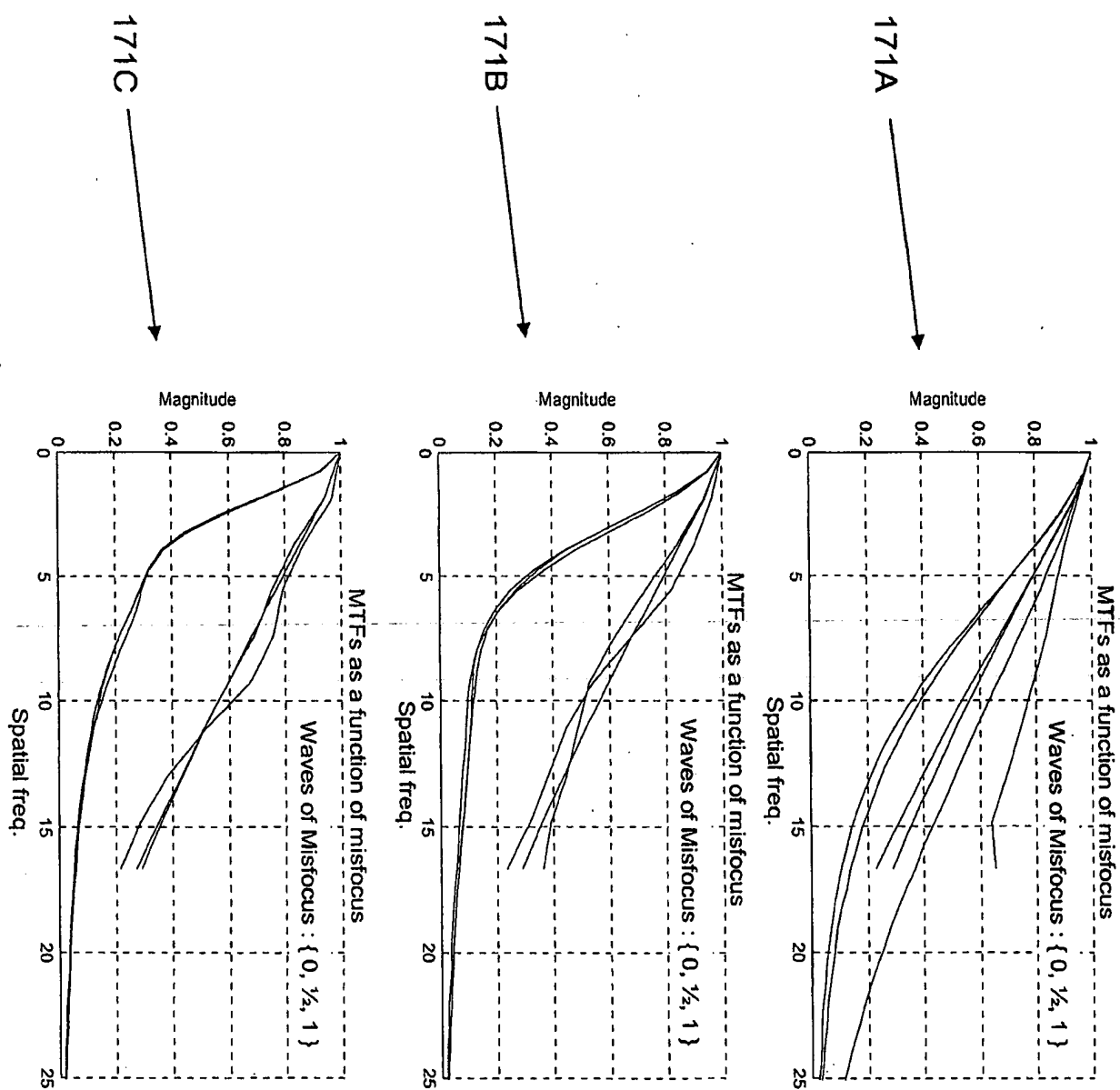
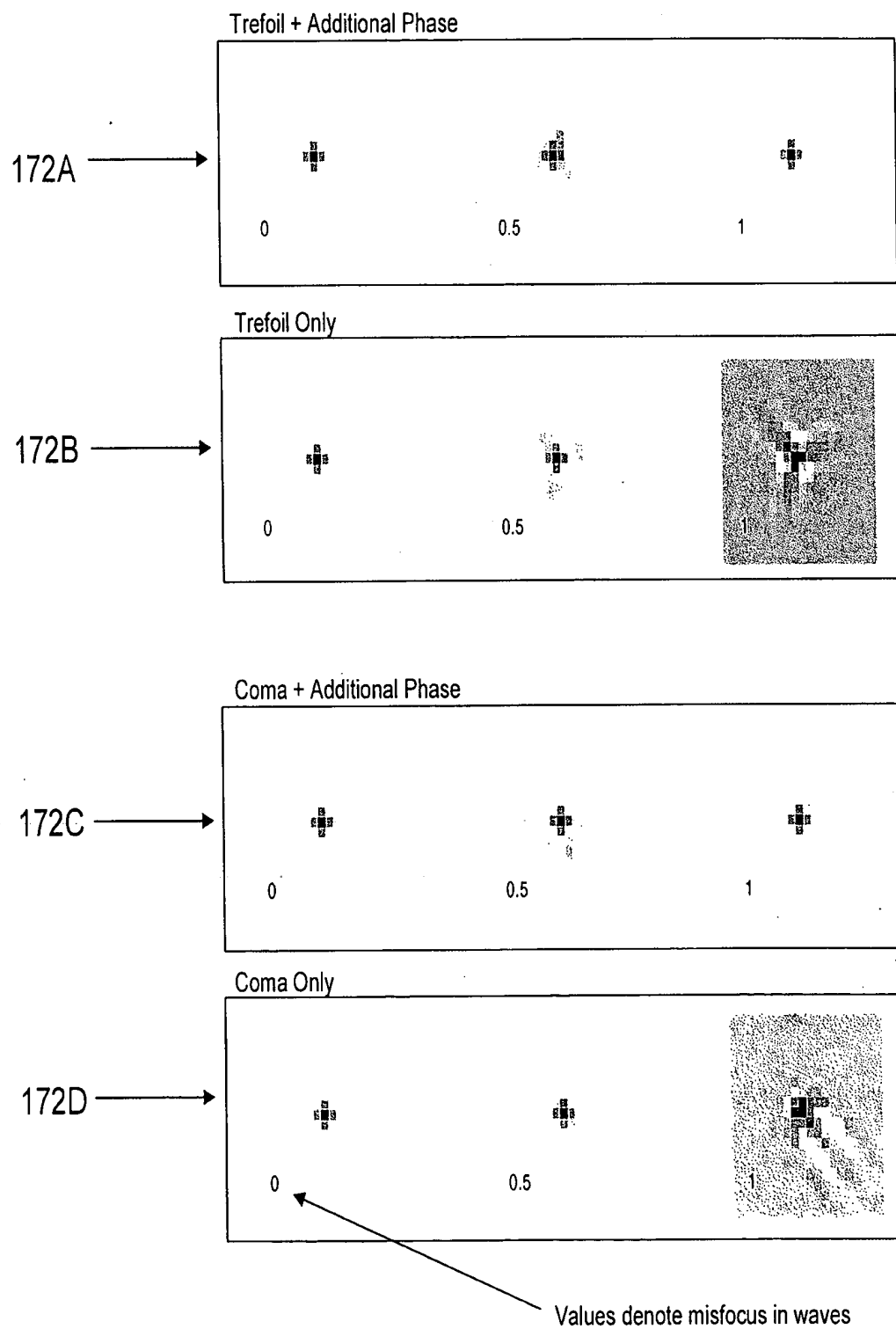


FIG. 17D



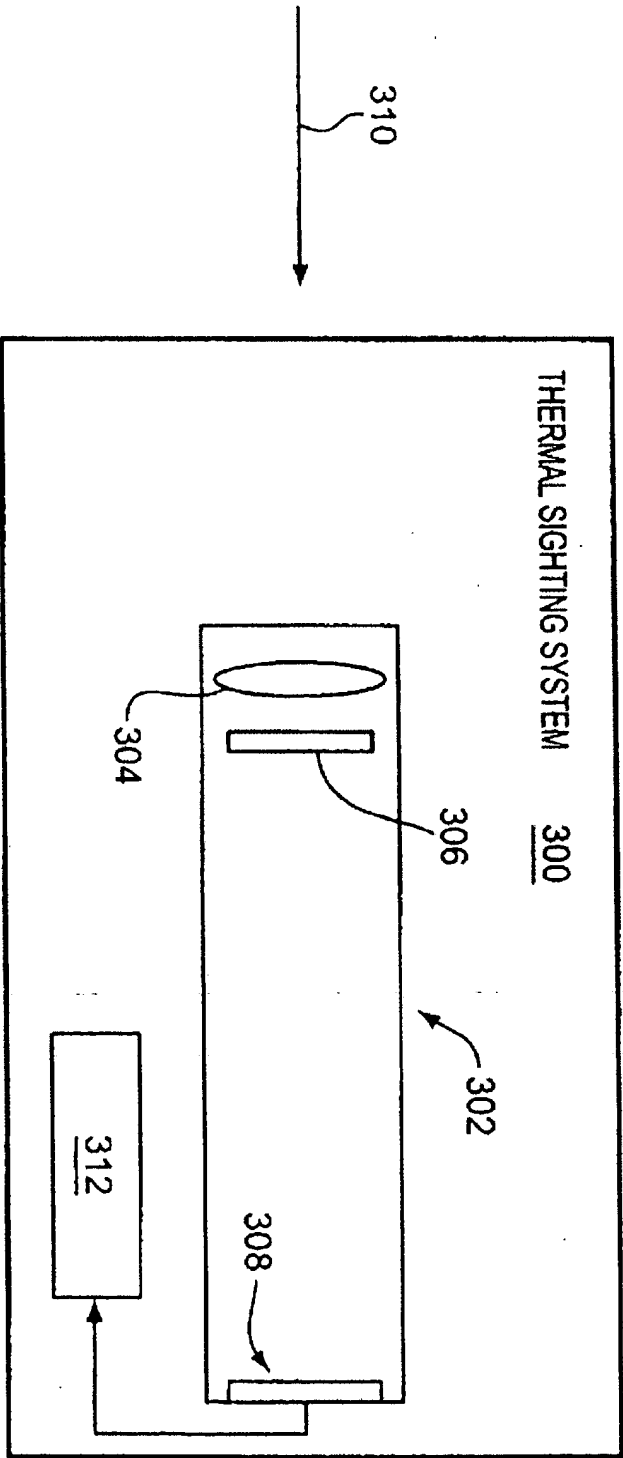


FIG. 18

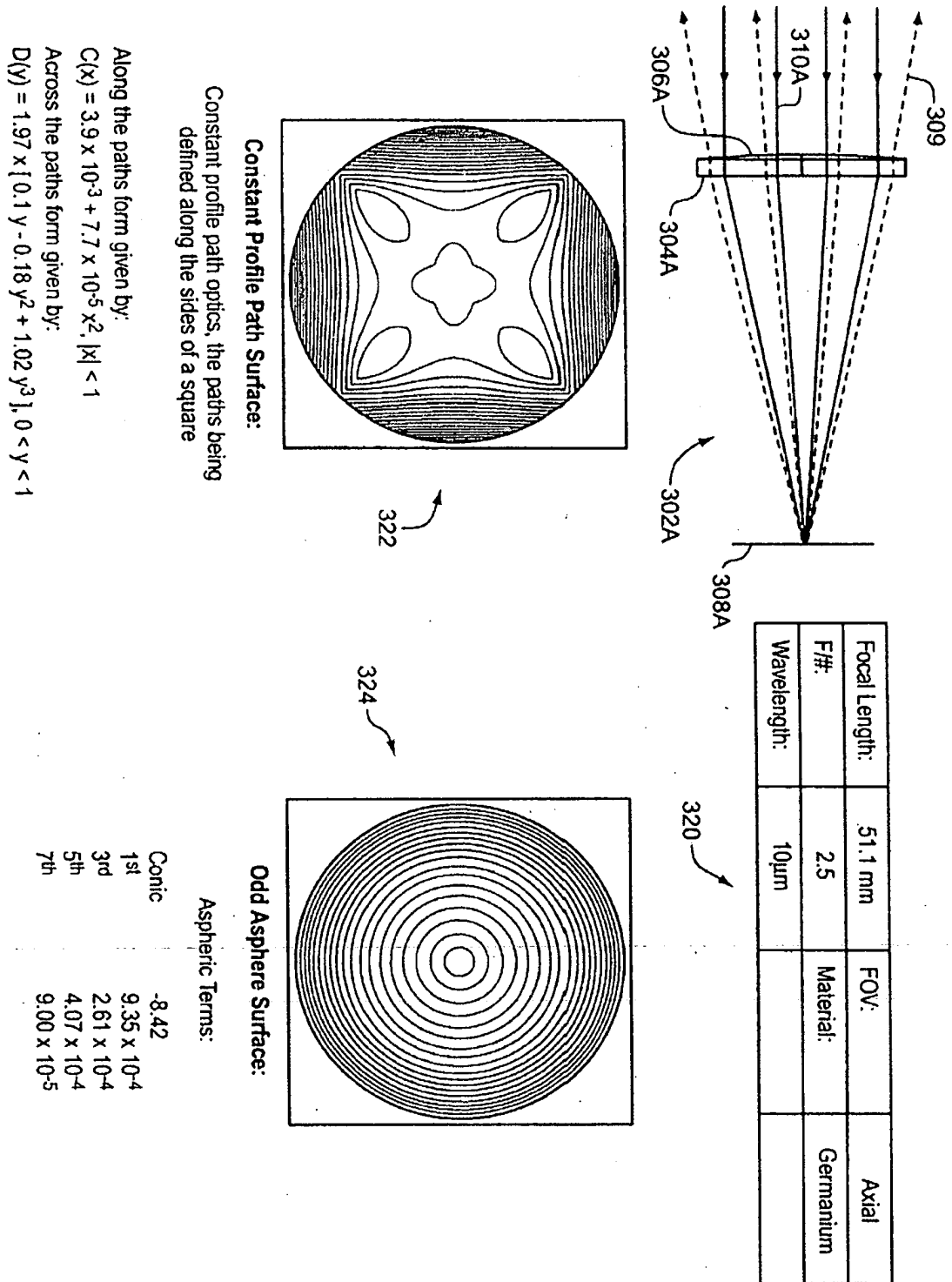


FIG. 19

FIG. 20A

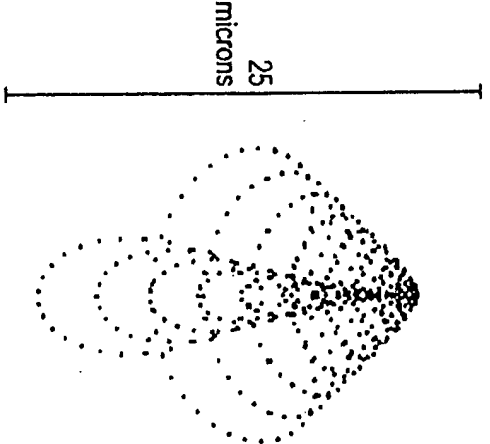
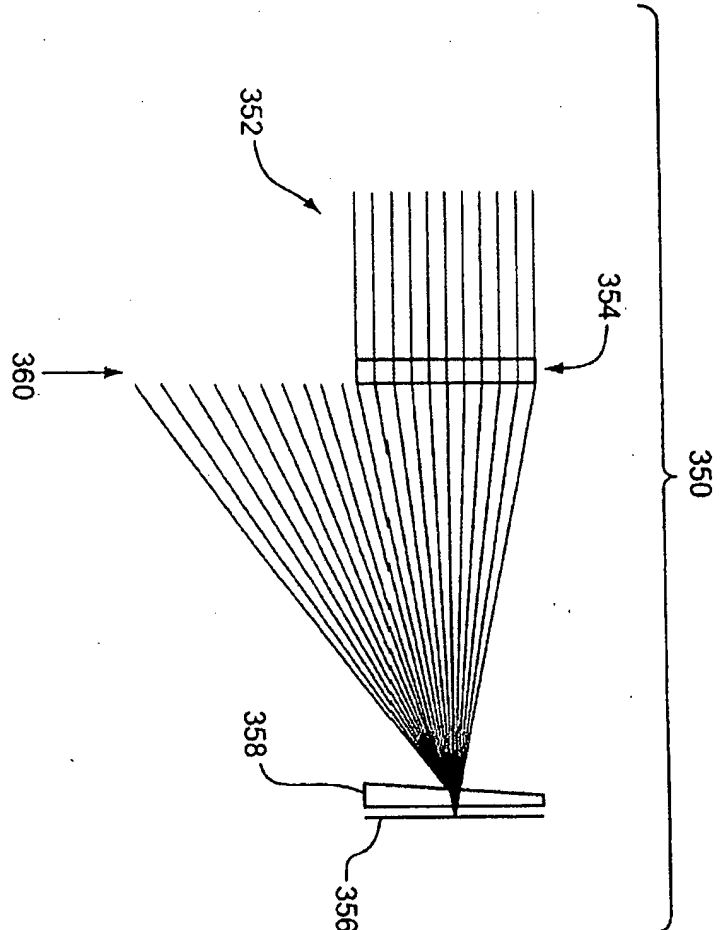


FIG. 20B

Title: METHODS FOR MINIMIZING ABERRATING EFFECTS IN IMAGING SYSTEMS

Inventor: Edward R. Dowski Jr. et al

Attorney Docket No: 420229

24/37

FIG. 21A

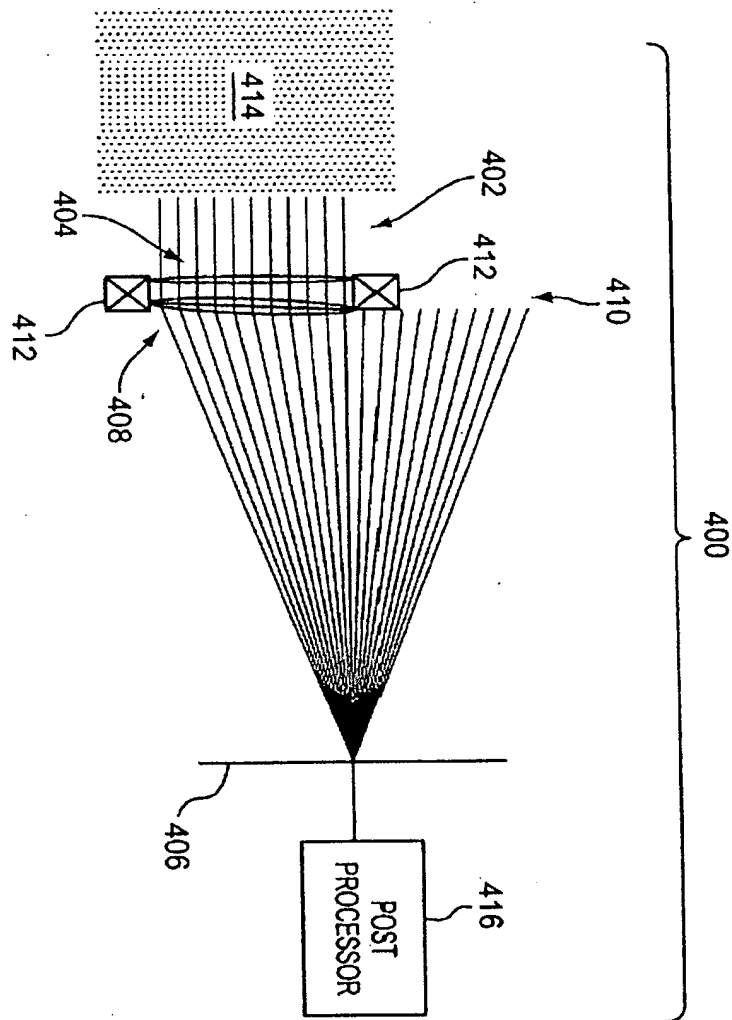
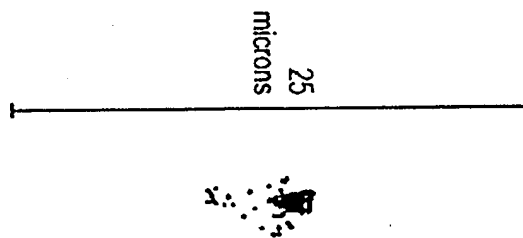


FIG. 21B



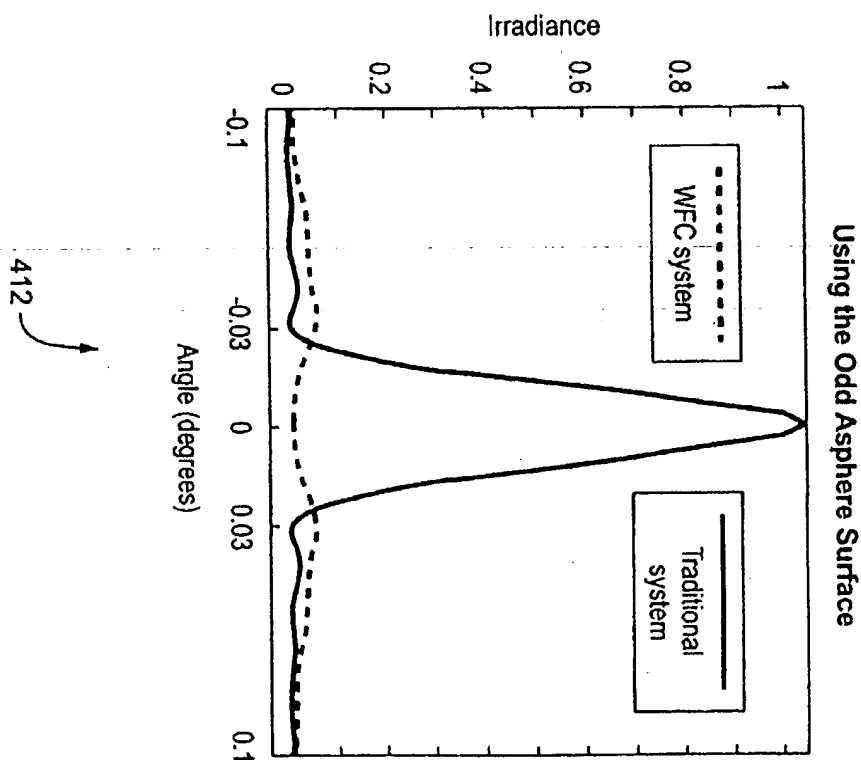
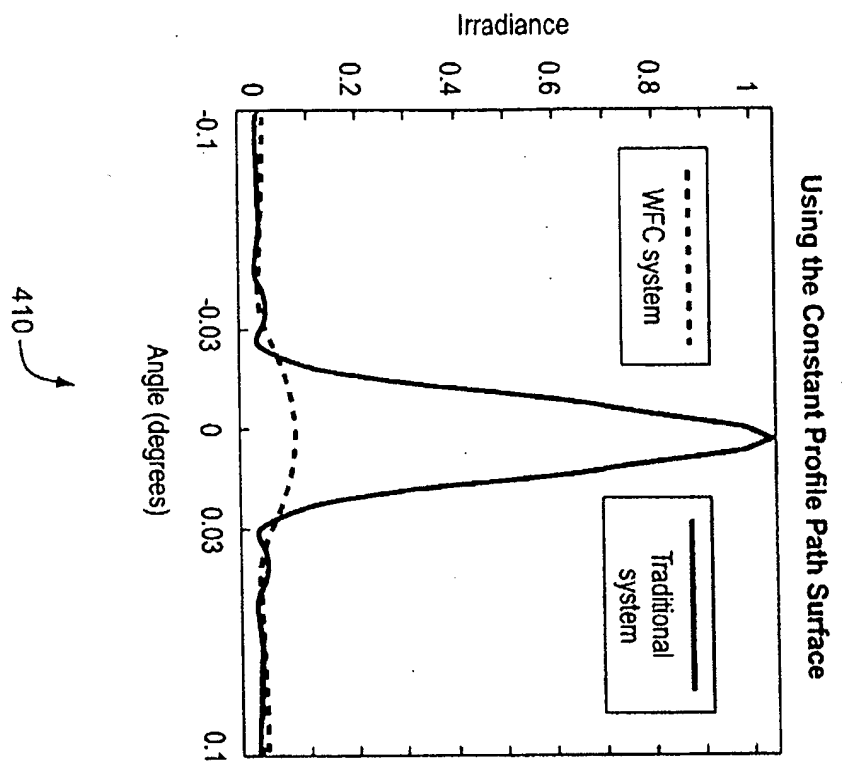


FIG. 22

FIG. 22A

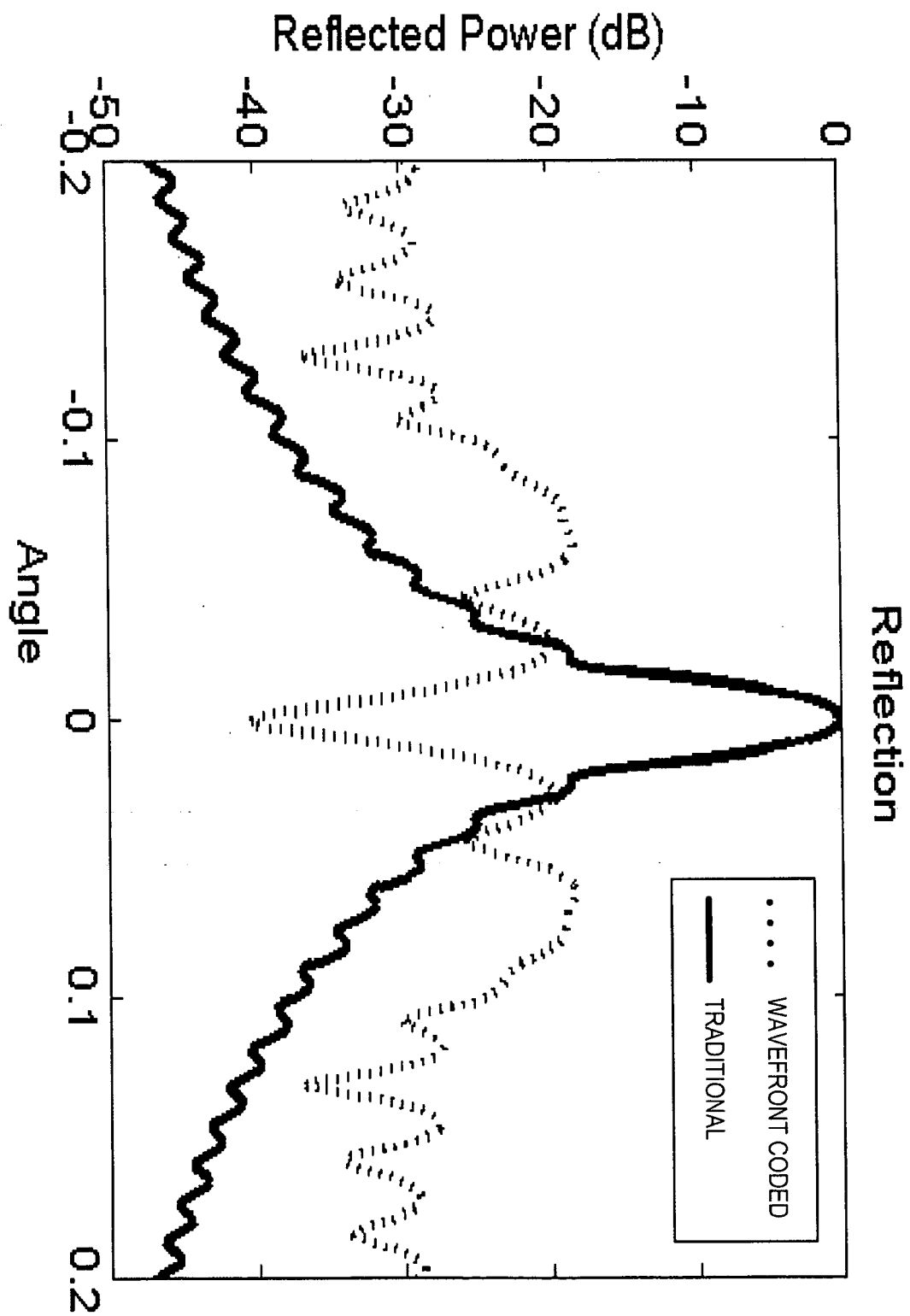


FIG. 22B

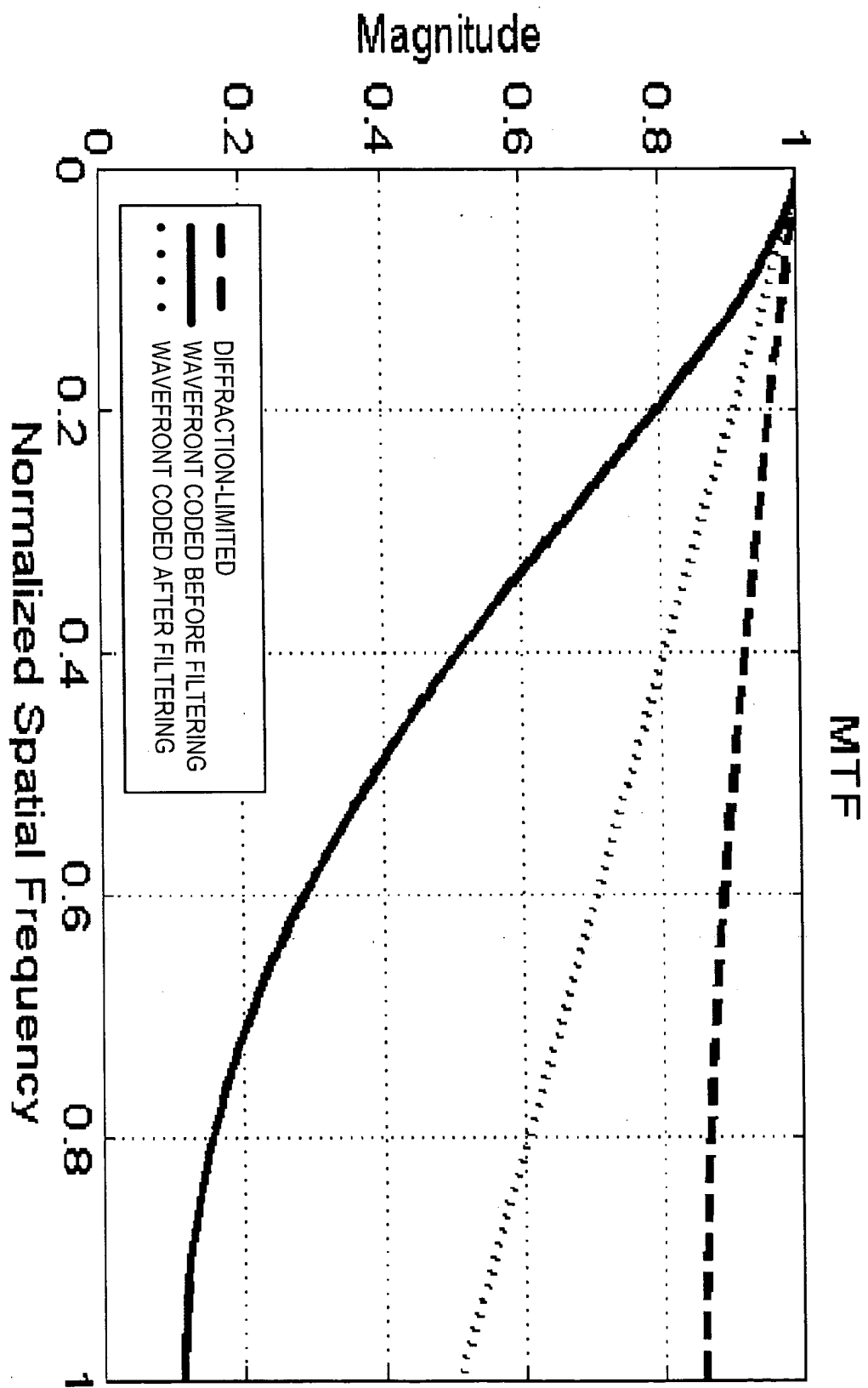
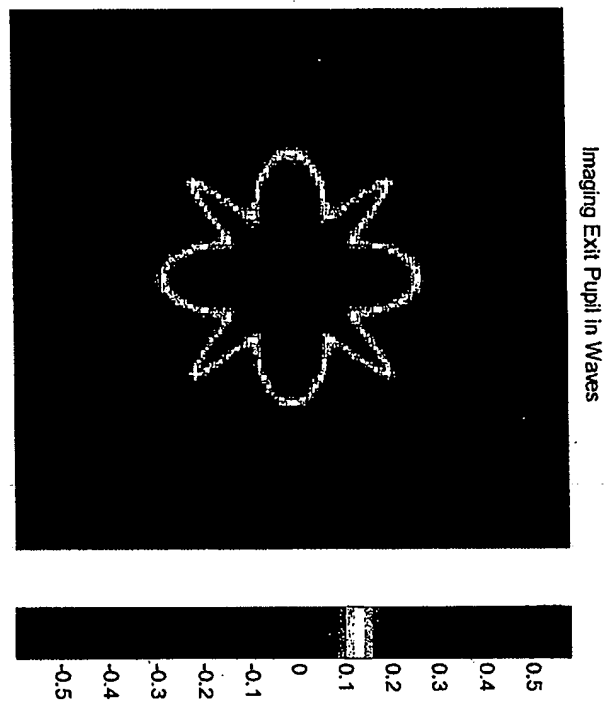


FIG. 22C



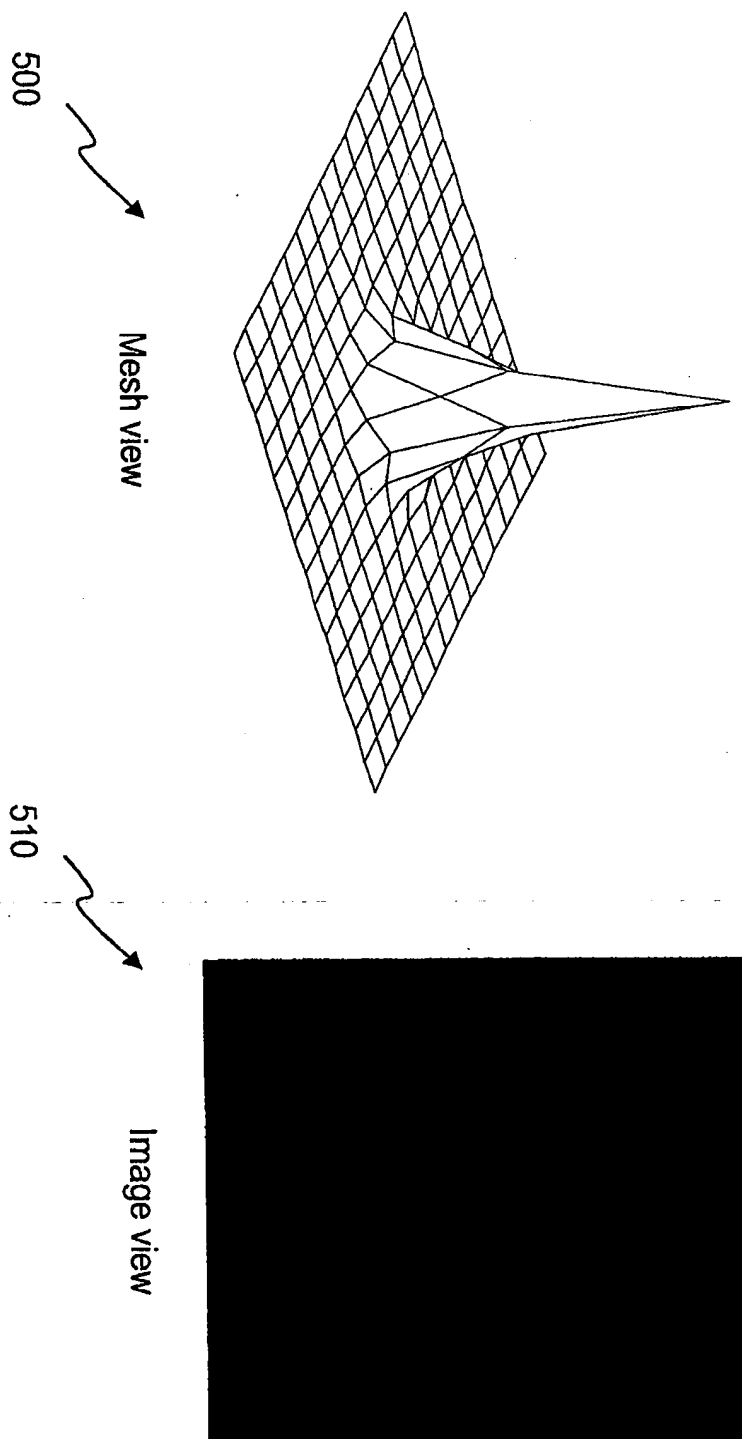
Title: METHODS FOR MINIMIZING ABERRATING EFFECTS IN IMAGING SYSTEMS

Inventor: Edward R. Dowski Jr. et al

Attorney Docket No: 420229

29/37

FIG. 22D



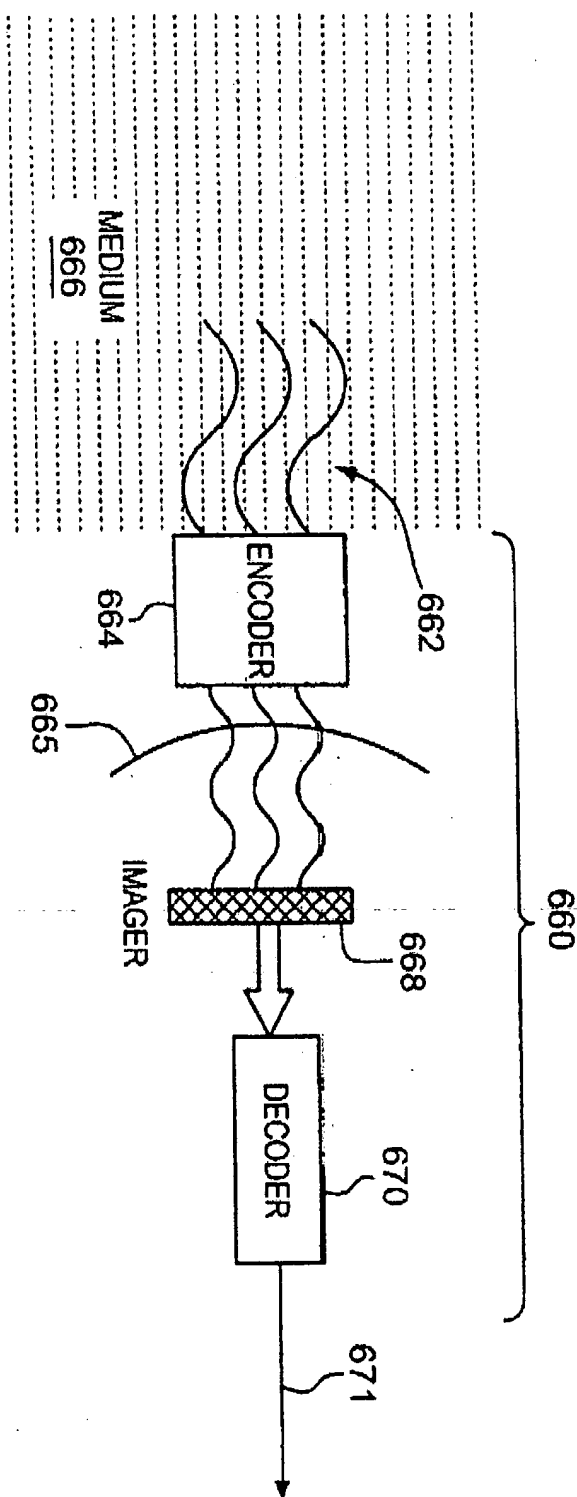


FIG. 23

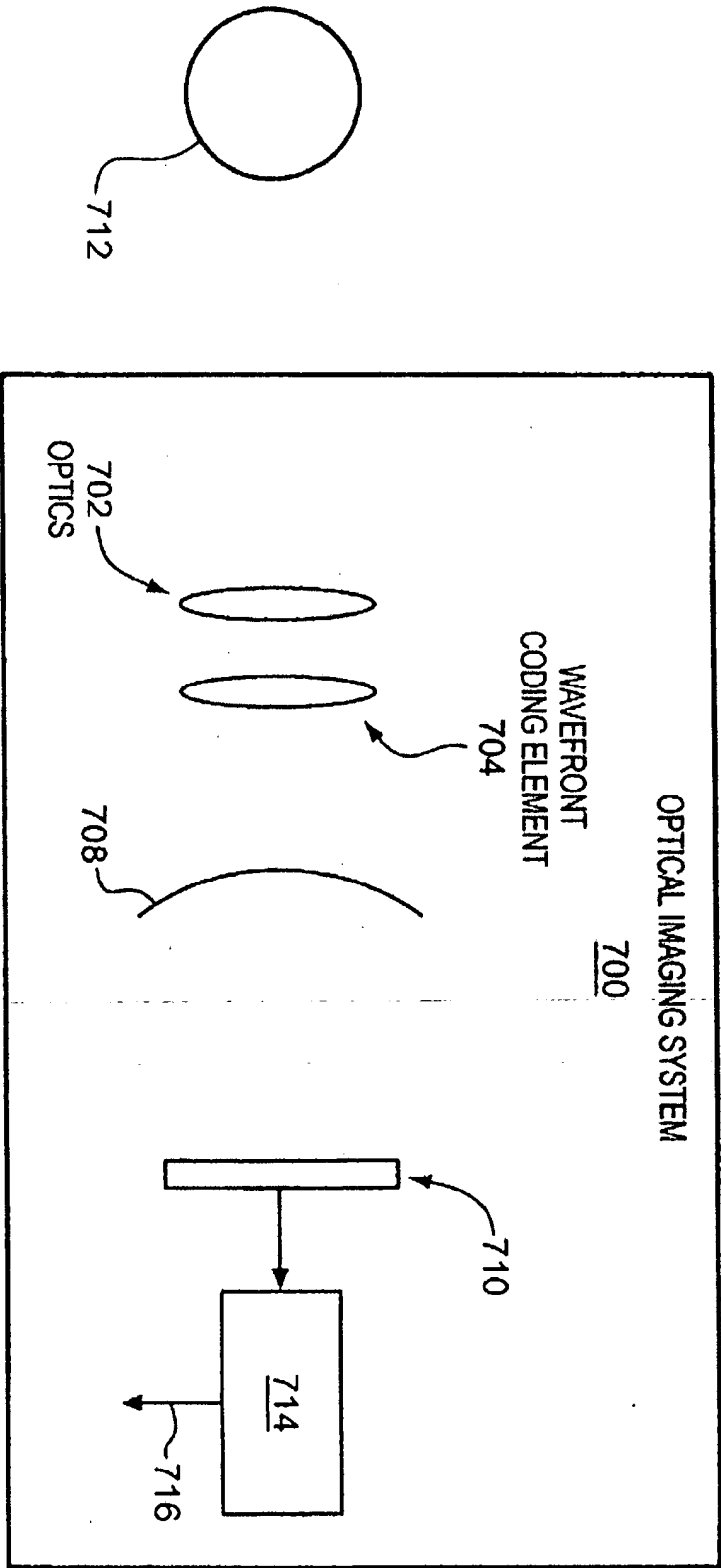


FIG. 24

Title: METHODS FOR MINIMIZING ABERRATING EFFECTS IN IMAGING SYSTEMS

Inventor: Edward R. Dowski Jr. et al

Attorney Docket No: 420229

32/37

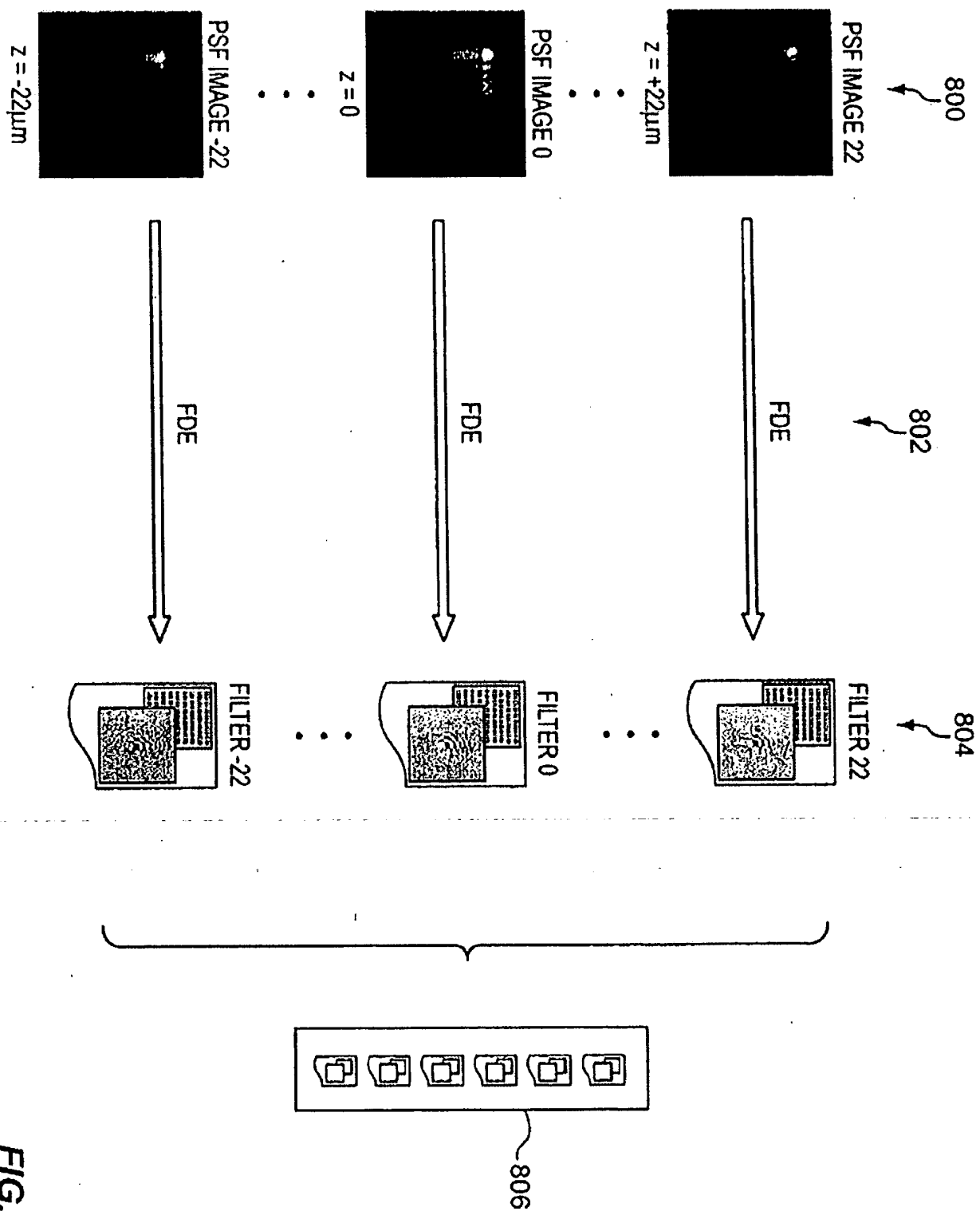


FIG. 25

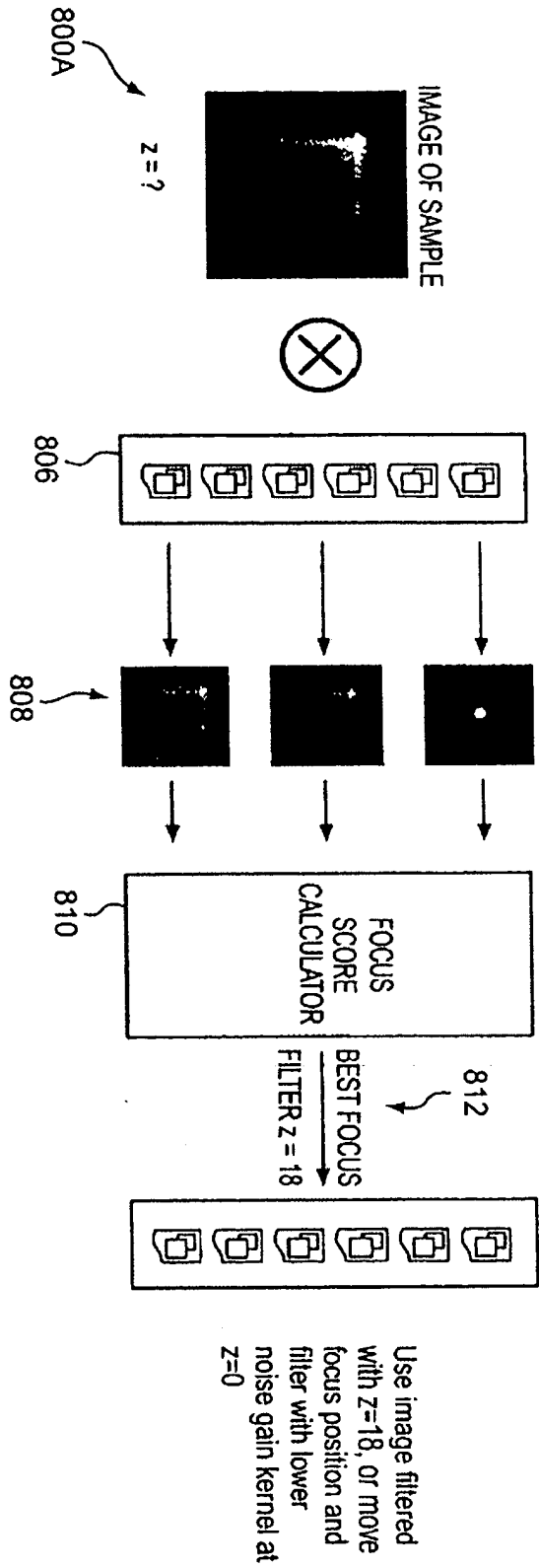


FIG. 26

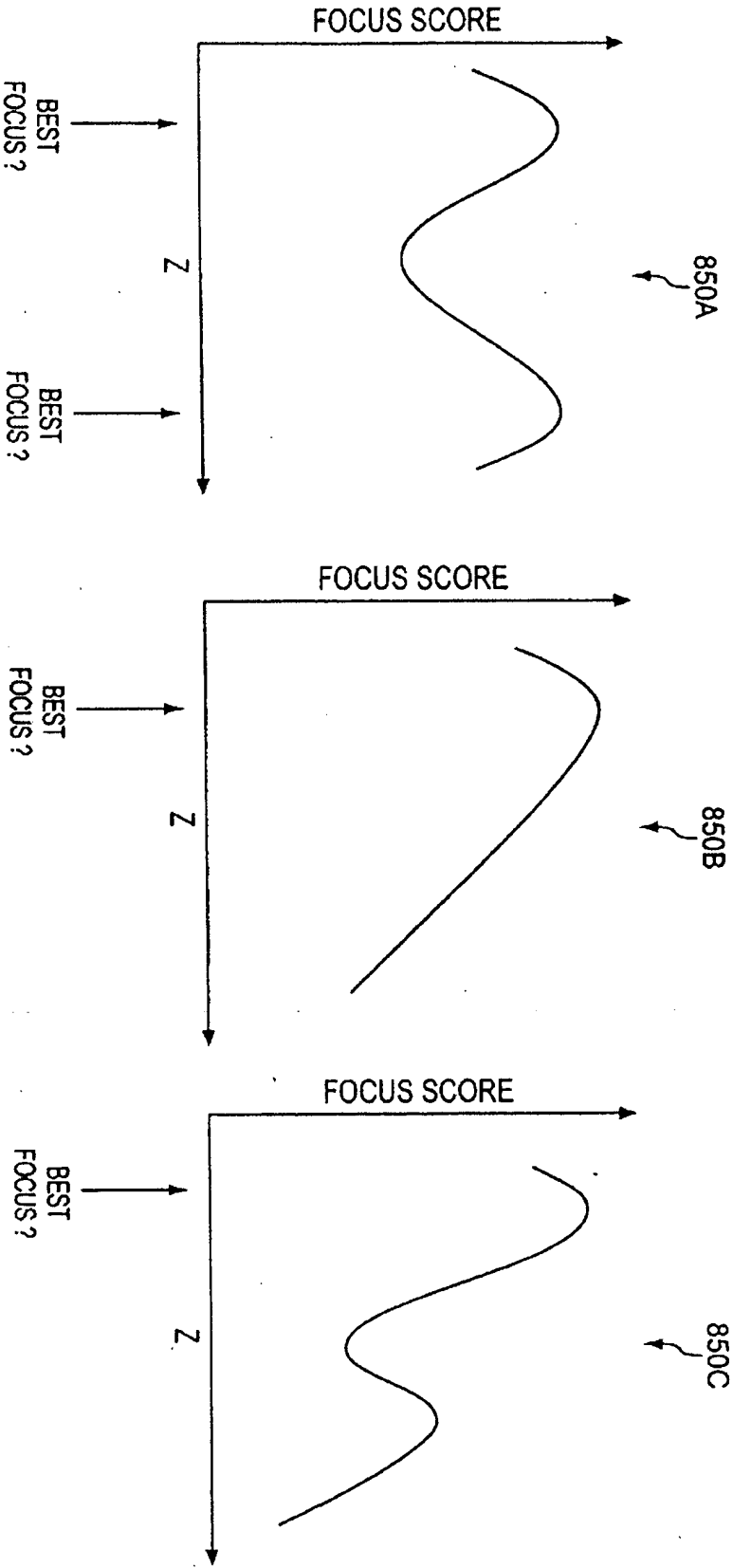
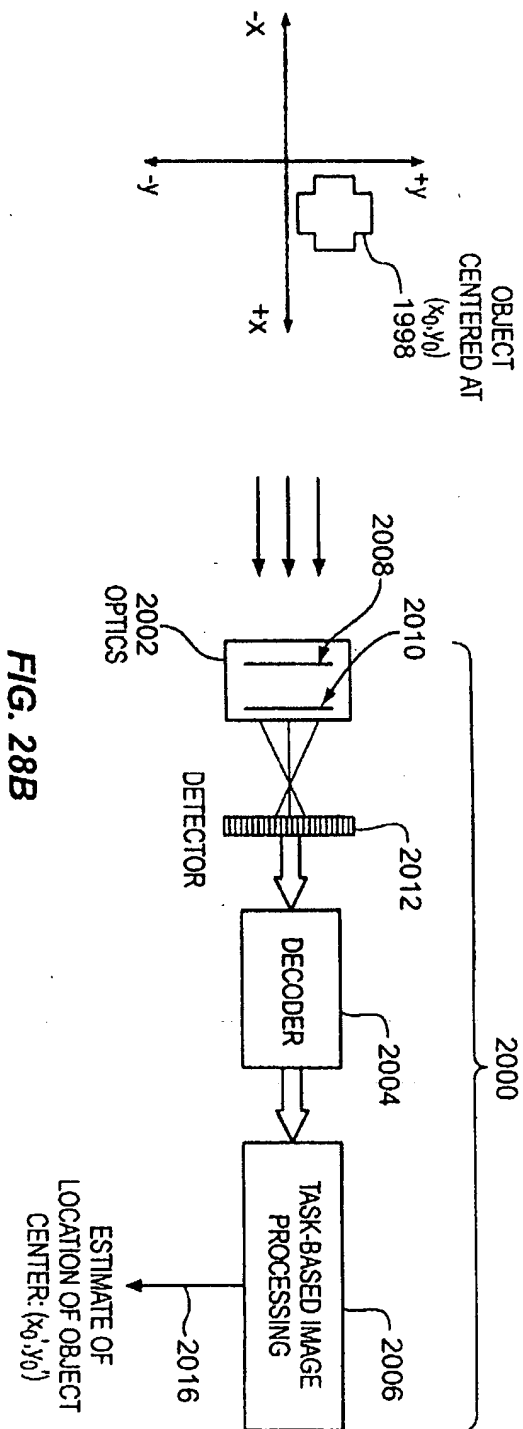
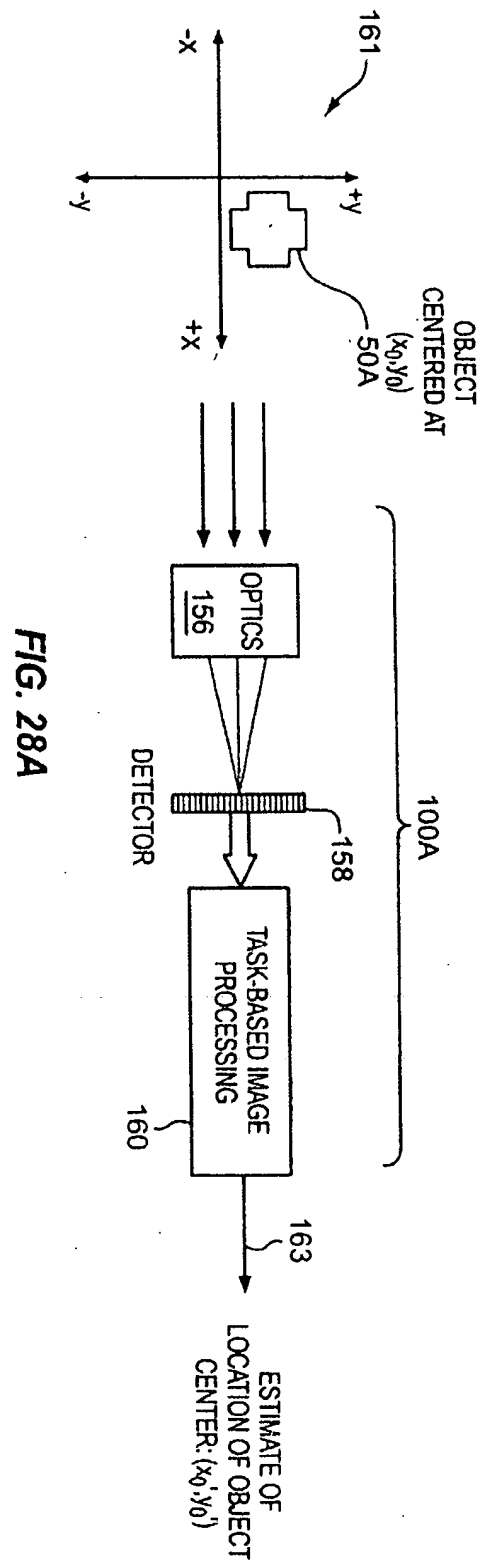


FIG. 27



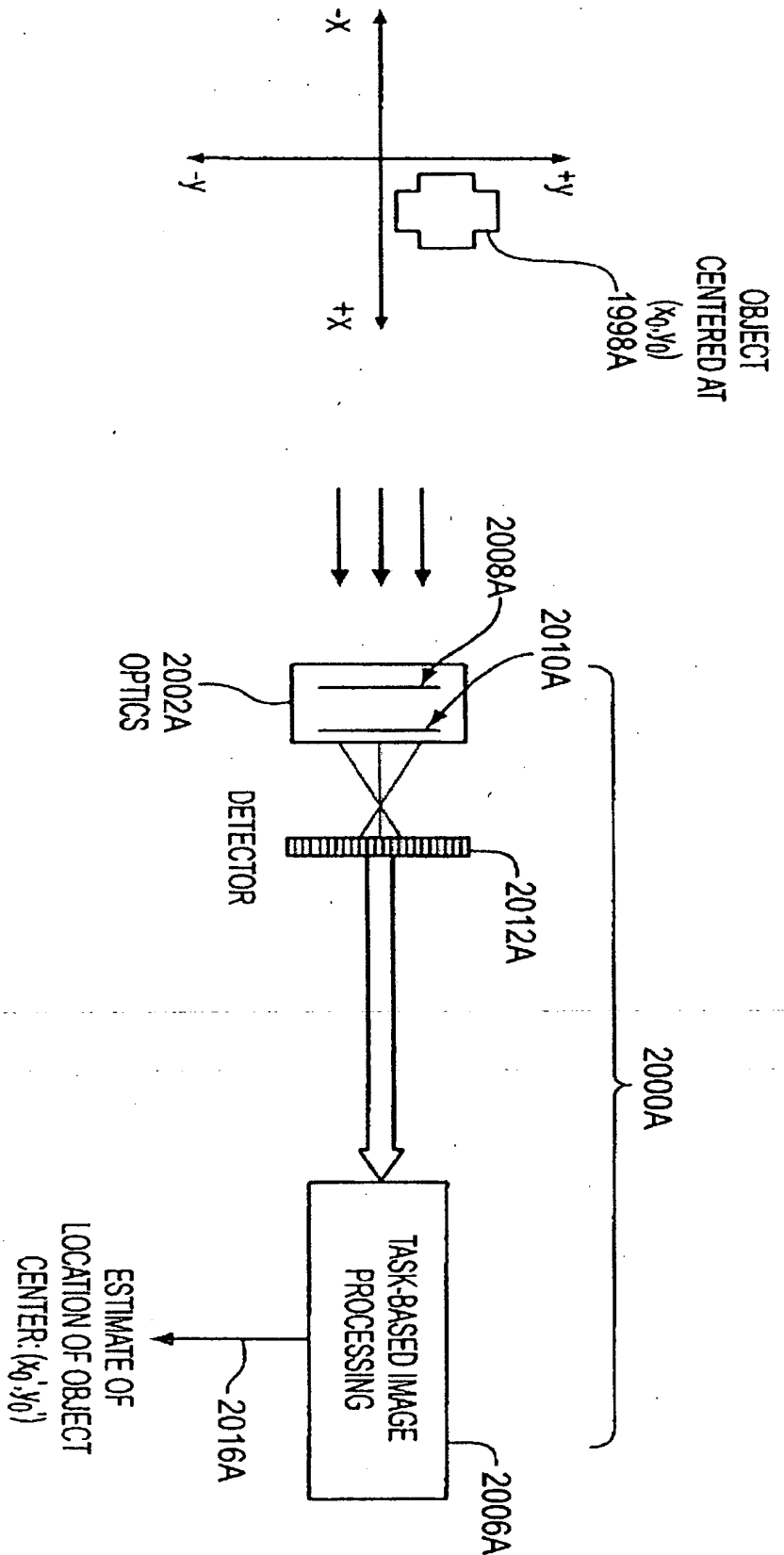


FIG. 28C

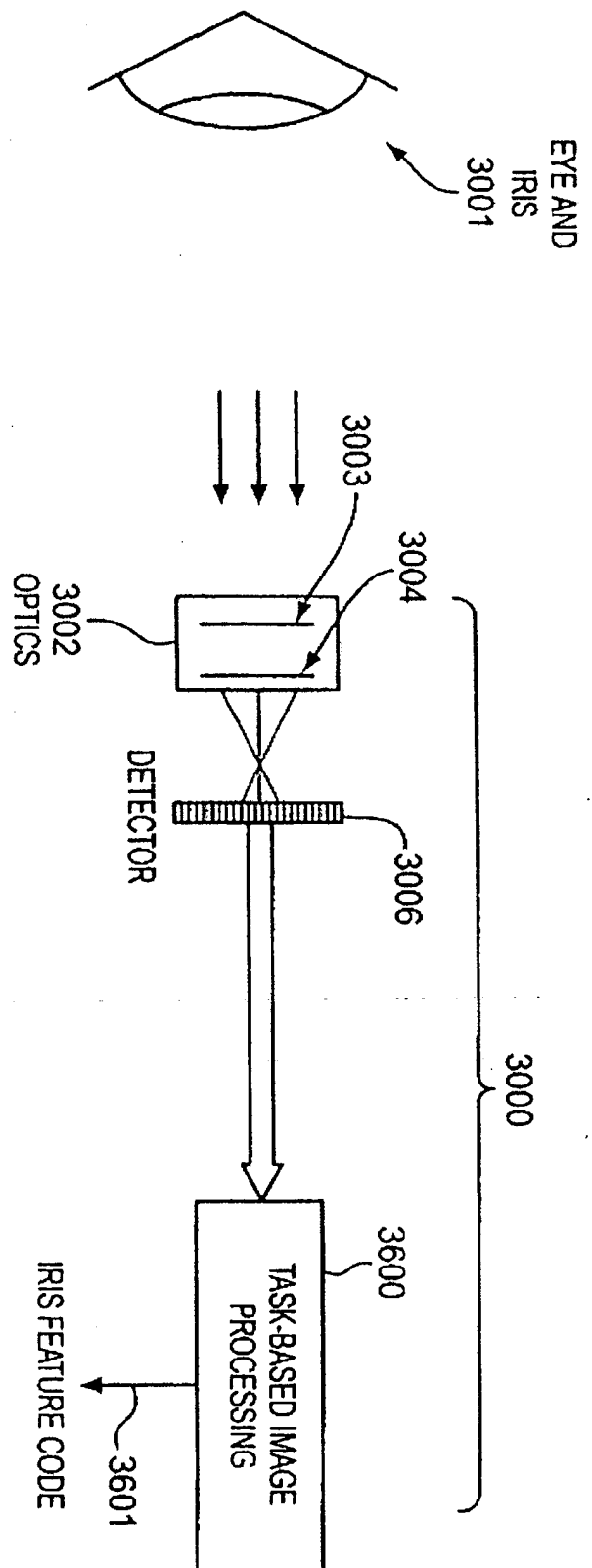


FIG. 29